COURSE STRUCTURE
AND
DETAILED SYLLABUS

ELECTRICAL AND ELECTRONICS ENGINEERING

For
B.TECH FOUR YEAR DEGREE PROGRAMME
(Applicable for the batches admitted from 2020-2021)

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)
Bollikunta, Warangal-506 005
Telangana State, India.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE STRUCTURE
(R20 Regulations applicable for the batches admitted from Academic Year 2020-2021)

I-SEMESTER

S.No	Course Code	Title of the Course	L	T	P	Credits
1	B20MA03	Linear Algebra and Complex Variables	3	1	0	4
2	B20CS01	Programming for Problem Solving	3	1	0	4
3	B20ME06	Fundamentals of Mechanical Engineering	3	0	0	3
4	B20CH02	Chemistry	3	0	0	3
5	B20EN02	English Language and Interactive Communication Skills Lab	0	0	3	1.5
6	B20CS02	Programming for Problem Solving Lab	0	0	2	1
7	B20ME03	Engineering and IT Workshop	0	0	3	1.5
8	B20MC01	Induction Program				
		Total Credits	**12**	**02**	**08**	**18**

II-SEMESTER

S.No	Course Code	Title of the Course	L	T	P	Credits
1	B20MA05	Differential Calculus and Numerical Methods	3	1	0	4
2	B20EE04	Electrical Circuits – I	3	1	0	4
3	B20EC01	Basic Electronic devices	3	1	0	4
4	B20PH02	Physics	3	0	0	3
5	B20EE05	Electrical Engineering Practice Lab	0	0	3	1.5
6	B20PH05	Physics Lab	0	0	2	1
7	B20ME01	Engineering Drawing	0	0	4	2
8	B20EC02	Basic Electronic devices Lab	0	0	3	1.5
9	B20MC02	Games/Sports				
		Total Credits	**12**	**03**	**12**	**21**

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SEMESTER

S.No	Course Code	Title of the Course	L	T	P	Credits
1	B20EE05	Electrical Circuits – II	3	0	0	3
2	B20EC03	Signals and Systems	3	0	0	3
3	B20EE07	Electrical Machines-I	3	0	0	3
4	B20EE08	Electromagnetic Fields	3	0	0	3
5	B20CS03	Python Programming	2	0	0	2
6	B20EN01	English for Effective communication	2	0	0	2
7	B20EE09	Electrical Circuits Lab	0	0	2	1
8	B20CS07	Python Programming Lab	0	0	2	1
9	B20EE11	Project Based Learning - 1	0	0	2	1
		Total Credits	**16**	**0**	**6**	**19**

I- **SEMESTER**

S.No	Course Code	Title of the Course	L	T	P	Credits
1	B20EE06	Power Systems – I	3	0	0	3
2	B20EE12	Electrical Machines-II	3	0	0	3
3	B20EE13	Electrical Measurements and Instrumentation	3	0	0	3
4	B20CS27	OOPS through JAVA	3	0	0	3
5	B20EC21	Analog and Digital Electronics	3	0	0	3
6	B20EC22	Analog and Digital Electronics Lab	0	0	2	1
7	B20EE15	Electrical Machines Lab – I	0	0	3	1.5
8	B20CS28	OOPS through JAVA Lab	0	0	3	1.5
9	B20EE14	Project Based Learning - 2	0	0	2	1
		Total Credits	**15**	**0**	**10**	**20**

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II- SEMESTER

S.No	Course Code	Title of the Course	L	T	P	Credits
1	B20EE15	Electrical Machines-III	3	0	0	3
2	B20EE16	Power Electronics	3	0	0	3
3	B20EE17	Control Systems	3	0	0	3
4	B20EE18	Power Systems-II	3	0	0	3
5	B20EE19 B20EE20 B20EC16	**Professional Elective-I** Renewable Energy Systems Industrial Instrumentation Computer Organization	3	0	0	3
6	B20EE21	Electrical Machines Lab-II	0	0	2	1
7	B20EE22	Electrical Measurements and Instrumentation Lab	0	0	2	1
8	B20EE23	Electrical Simulation Lab	0	0	2	1
9	B20EE24	Project Based Learning-3	0	0	2	1
10	B20MC04	Human Values and Professional Ethics	2	0	0	0
		Total Credits	**17**	**0**	**8**	**19**

III- SEMESTER

S.No	Course Code	Title of the Course	L	T	P	Credits
1	B20EE25	Computer Methods in Power Systems	3	0	0	3
2	B20EE26	Power Semiconductor Drives	3	0	0	3
3	B20MB01	Managerial Economics and Financial Analysis	3	0	0	3
4	B20EE27 B20EE28 B20EC24	**Professional Elective-II** Electrical Distribution Systems Electrical Engineering Materials Digital Signal Processing	3	0	0	3
5		**Open Elective-I**	3	0	0	3
6	B20EE29	Power Electronics Lab	0	0	2	1
7	B20EE30	Control Systems Lab	0	0	2	1
8	B20EE31	Electronics Design Lab	0	0	2	1
9	B20EE32	Project Based Learning-4	0	0	2	1
10	B20MC05	Logical Reasoning and Quantitative Aptitude	2	0	0	0
		Total Credits	**17**	**0**	**8**	**19**

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COURSE STRUCTURE
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IV- SEMESTER

S.No	Course Code	Title of the Course	L	T	P	Credits
1	B20EE33	Power Systems Operation and Control	3	0	0	3
2	B20EE34	Power System Protection	3	0	0	3
3	B20EC32	Microprocessors and Microcontrollers	3	0	0	3
4	 B20EE35 B20EE36 B20EE37 B20EE38	**Professional Elective-III** High Voltage Engineering Advanced Power Electronics Advanced Control Systems Electrical Machine Design	3	0	0	3
5	 B20EE39 B20EE40 B20EE41 B20EE42	**Professional Elective-IV** Advanced Electrical Drives AI Techniques in Electrical Engineering Utilization of Electrical Energy High Voltage DC Transmission	3	0	0	3
6		**Open Elective-II**	3	0	0	3
7	B20EC42	Microprocessors and Microcontrollers Lab	0	0	2	1
8	B20EE43	Power Systems Lab	0	0	2	1
9	B20EE44	Mini Project & Internship#	0	0	0	2
10	B20EE45	Major Project Phase-1	0	0	8	4
		Total Credits	**18**	**0**	**12**	**26**

The student should undergo Mini Project & Internship for a minimum period of two months during the summer vacation of 3rd year. Mini Project & Internship will be evaluated at the beginning of the VII semester by assessing the report and seminar presentations**.**

V- SEMESTER

S.No	Course Code	Title of the Course	L	T	P	Credits
1	 B20EE46 B20EE47 B20EE48 B20EC33	**Professional Elective-V** Soft Computing Techniques Digital Control Systems Flexible AC Transmission Systems VLSI Design	3	0	0	3
2	 B20EE49 B20EE50 B20EE51 B20EC45	**Professional Elective-VI** Power Quality Electric and Hybrid Vehicles Smart Electric Grids Embedded Systems	3	0	0	3
3		**Open Elective-III**	3	0	0	3
4	B20EE52	Technical Seminar	0	0	2	1
5	B20EE53	Major Project Phase-II	0	0	16	8
		Total Credits	**9**	**0**	**18**	**18**

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COURSE STRUCTURE

(R20 Regulations applicable for the batches admitted from Academic Year 2020-2021)

R20 B.Tech list of open electives. (Applicable form 2020-2021 admitted batch)

S.No.	Subject code	Subject	L	T	P	Credits	Offered Dept
1	B20CE55	Disaster Preparedness & Planning Management	3	0	0	3	CIVIL
2	B20CE56	Environmental Management	3	0	0	3	CIVIL
3	B20CE57	Urban Planning	3	0	0	3	CIVIL
4	B20EE54	Electrical Power Utilisation and Safety	3	0	0	3	EEE
5	B20EE55	Concepts of Control systems	3	0	0	3	EEE
6	B20EE56	Renewable Energy Sources	3	0	0	3	EEE
7	B20ME59	Non-Conventional Energy Sources	3	0	0	3	MECH
8	B20ME45	Robotics	3	0	0	3	MECH
9	B20ME33	Mechatronics	3	0	0	3	MECH
10	B20EC37	Digital Image Processing	3	0	0	3	ECE
11	B20EC46	Wireless and Mobile Communication	3	0	0	3	ECE
12	B20EC49	Sensor Networks	3	0	0	3	ECE
13	B20EC61	Biomedical Instrumentation	3	0	0	3	ECE
14	B20CS19	Data base Management Systems	3	0	0	3	CSE
15	B20CS12	Java Programming	3	0	0	3	CSE
16	B20CS55	Introduction to Network Security	3	0	0	3	CSE
17	B20CS56	Introduction to Cloud Computing	3	0	0	3	CSE
18	B20CS37	Internet of Things	3	0	0	3	CSE
19	B20CS04	Data Structures and Algorithms	3	0	0	3	CSE
20	B20AI03	Artificial Intelligence	3	0	0	3	CSE(AI&ML)
21	B20AI29	Introduction to Machine Learning	3	0	0	3	CSE(AI&ML)
22	B20AI30	Neural Networks	3	0	0	3	CSE(AI&ML)
23	B20AI31	Introduction to Cyber Security	3	0	0	3	CSE(AI&ML)
24	B20DS24	Introduction to Data science	3	0	0	3	CSE(DS)
25	B20DS25	Data Handling and Visualization	3	0	0	3	CSE(DS)
26	B20DS26	Introduction to Big Data	3	0	0	3	CSE(DS)
27	B20DS27	Introduction to Computer Forensics	3	0	0	3	CSE(DS)
28	B20MB02	Management Science	3	0	0	3	MBA
29	B20MB03	Entrepreneurship Development	3	0	0	3	MBA
30	B20MB06	Intellectual Property Rights	3	0	0	3	MBA

Note: Students should take open electives from the list of open electives offered by the other departments/branches only.

VAAGDEVI COLLEGE OF ENGINEERING
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LINEAR ALGEBRA AND COMPLEX VARIABLES

B. TECH- I Semester **L/T/P/C**
3/1 /0 /4

Pre-requisites: None

Course Objectives:

To learn

- Concept of rank of matrix and apply to know the consistency of system of linear equations.
- To determine Eigen values, Eigen vectors of matrices.
- Geometrical approach to the mean value theorems and their applications.
- Differentiation and integration of complex functions.
- Expansion of complex functions using Taylor's and Laurent's series.

UNIT-I

Matrices: Types of Matrices: Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian, orthogonal, unitary matrices, Rank of a matrix by Echelon form and Normal form, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations.

UNIT-II

Eigen Values and Eigen vectors: Linear Transformation and Orthogonal Transformation: Eigen values and Eigen vectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem;

UNIT-III

Calculus: Mean value theorems: Rolle's theorem, Lagrange's Mean value, Cauchy's Mean value Theorem. Taylor's Series. Partial derivatives, Maxima and Minima of functions of two variables.

UNIT-IV

Complex variable and Integration: Limit, Continuity and Differentiability, Analytic functions, Cauchy – Riemann conditions in Cartesian and Polar Form, Cauchy's integral theorem, Cauchy's integral formula (All theorems without proof).

UNIT-V

Power Series and Residues: Taylor's series, Laurent's series, Residues, Cauchy's Residue Theorem (All theorems without proof) , Evaluation of real Integrals: $\int_0^{2\prod} f(\sin\theta, cos\,\theta)\,d\theta$, $\int_{-\infty}^{\infty} f(x)dx$.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2012.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John wiley& Sons, 2006.
3. Complex Variables and Applications : J.W. Brown & R.V. Churchill, 7th Edition, Mc. Grawhill, 2004

REFERENCE BOOKS:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
4. Fundamentals of Complex Analysis: Sal E.B. and A.B. Sinder Pearson.

COURSE OUTCOMES:

On successful completion of this course, students are able to:

CO1: Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods.

CO2: Determine Eigen values, Eigenvectors of matrices.

CO3: Calculate Partial derivatives, extreme of functions of multiple variables.

CO4: Analyze the complex function with reference to their analyticity and evaluate using integral theorems.

CO5: Expand the complex function using power series.

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VAAGDEVI COLLEGE OF ENGINEERING
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PROGRAMMING FOR PROBLEM SOLVING

B. TECH- I Semester **L/T/P/C**
3/1 /0 /4

Pre-requisites: None

Course Objectives:

- To provide the necessary knowledge on general engineering problem solving methodologies.
- To provide necessary foundations for step by step computer program development and to present the basic concepts in C programming language.
- To prepare the students to write modular and readable C Programs.
- The Course introduces the essential concepts like abstract data types, user defined data types.
- To analyze the performance of algorithms and how to use such knowledge for later processing with the help of files.
- Aims to train the students to write working programs to solve problems.

UNIT-I

Introduction: Steps in Problem Solving, Algorithms, Flowcharts, Pseudo code, Types of Programming Languages, Introduction to C, History of C, Structure of a C Program.

Introduction to C Programming: The C Character Set, Identifiers and - Keywords, Data Types, Constants and Variables, Declarations, Expressions & Statements, Input / Output Statements (Formatted and Unformatted), Creating and Running a Cprogram.

Operators and Expressions: Unary Operators, Arithmetic Operators, Relational and Logical Operators, Assignment Operators, Conditional operator, Bitwise Operators, special operators, Precedence & Associativity, Type Casting and Type Conversion.

UNIT-II

Control Statements: Branching Statements – if, if-else, else- if, nested-if. Switch statement. Un - conditional Branching Statement- goto. Looping Statements- while, do-while, for, nested loops. Break &Continue.

Functions : Introduction, Defining a Function, Types of Functions, Accessing a Function, Function Prototypes, Passing Arguments to a Function – call by value, Recursion.

Storage Classes: Automatic Variables, External (Global) Variables, Static Variables, Register.

UNIT-III

Arrays: Definition - Single Dimensional Arrays, Multi Dimensional Arrays, Declaration, Initialization, Reading & Writing elements in to an Array, Passing Arrays to Functions. Linear Search, Binary search, Bubble sort.

Strings: Declaration and Initialization of Strings, Reading and Writing a String, String Manipulation Functions, String as Array of Characters, Array of strings, Sorting of Strings.

Structures and Unions: User-Defined Data Types , Defining a Structure, Processing a Structure, Array of Structures, Nested Structures, Passing Structures To Functions.Unions. Typedef, Enumerated types - enum.

UNIT-IV

Pointers: Introduction, Pointer Declarations, Pointer to Pointer, Operations on Pointers -Pointer Arithmetic, Dynamic Memory Allocation – Malloc(), Calloc(), Realloc(), Free(). Pointers and Functions - call by Reference, Pointers and Arrays (one dimensional, two dimensional), Array of Pointers. Structures and Pointers, Self-Referential Structures.

UNIT-V

File Handling: Introduction, Text Files and Binary Files, File Handling Functions-Opening and Closing a File, File Opening Modes, Reading and Writing a File. Random Access File Functions – fseek() , rewind(), ftell(). Command Line Arguments, C Preprocessor Directives.

TEXT BOOKS:

1. Byron Gottfried, *"Programming with C"* . Third Edition(Schaum's Outlines) McGrawHill.

REFERENCE BOOKS:

1. B.A. Forouzanand R.F. Gilberg, *"C Programming and Data Structures"*, Cengage Learning (3rdEdition)
2. Pradip Dey& Manas Ghosh, *"Programming in C"*, 2nd Edition , Oxford University Press,2013.
3. E. Balaguruswamy , *"Programming in ANSI C "* ,McGraw-Hill Education,2008.

COURSE OUTCOMES:

On successful completion of this course, students are able to:

CO1: Understanding how problems are posed and how they can be analyzed for obtaining solutions.
CO2: Understanding the fundamentals of C programming.
CO3: Learning of sequencing, branching, looping and decision-making statements to solve scientific and engineering problems.
CO4: Implementing different operations on arrays and creating and using of functions to solve problems.
CO5: Design and implement different types of file structures using standard methodology.

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VAAGDEVI COLLEGE OF ENGINEERING
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FUNDAMENTALS OF MECHANICAL ENGINEERING

B. Tech : I-Semester **L/T/P/C**
3/0 /0 /3

Pre-requisites: None

Course Objectives:

- Understand mechanism of power transfer through belt, rope, chain and gear drives
- Understand the working principle of internal combustion engine and its components details
- Demonstrate the understanding of working principle of steam power plant.
- Identify engineering materials, their properties, manufacturing methods encountered in engineering practice
- Understand working of various manufacturing techniques.

Unit I

Power Transmission: Transmission by Belt Drives, spur, helical and bevel gears, Chain drives, Simple Problems.

Unit II

IC Engines – 2 Stroke and 4 stroke systems in IC Engines. Automobiles - Transmission systems, Suspension system, E-Vehicles.

Unit III

Energy Systems - Power plants, Types, Gas Turbines, Steam Turbines, Utility boilers, R & A/C system (Summer and Winter) - Green Energy production and Devices.

Unit IV

Engineering materials, Machine elements, Fasteners and Support systems.

Unit V

Manufacturing, Classification, Metal forming, Casting (Sand, Investment, Die, Centrifugal), Lathe, Drilling machines, Milling, machines, Metal joining (Arc, Welding, Gas Welding, TIG and MIG Welding, Resistance Welding).

TEXT BOOKS:

1. Elements of Mechanical Engineering, N M Bhatt and J R Mehta, Mahajan Publishing House
2. Basic Mechanical Engineering, Pravin Kumar, Pearson Education
3. Elements of Mechanical Engineering, Sadhu Singh, S. Chand Publication.

COURSE OUTCOMES:

On successful completion of this course, students are able:

CO1: To understand the various sources of energy and basic terminology of Mechanical systems
CO2: To understand the various types of automobile engines
CO3: To understand and appreciate significance of mechanical engineering in different fields of engineering
CO4: To understand power transmission elements, and applications of various engineering materials
CO5: To understand various manufacturing processes.

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VAAGDEVI COLLEGE OF ENGINEERING
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CHEMISTRY

B. Tech : I-Semester (EEE&ECE) **L/T/P/C**
3/0 /0 /3

Pre-requisites: None

Course Objectives:

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To acquire the knowledge of electrochemistry, different batteries.
- To acquire the knowledge of corrosion and it's control methods which are essential for the Engineers and in industry.
- To acquire the knowledge of water treatment which is essential for the Engineers and in industry.
- To acquire the knowledge of resistors and capacitors.
- To acquire the skills and knowledge to organic reactions and importance of polymers in engineering and everyday life.

UNIT-I

Electrochemistry & Batteries

Introduction to electrochemistry, conductance-specific, equivalent and molar conductance, units and their relation. Electrochemical and Electrolytic cells, Galvanic cell, measurement of e.m.f. and single electrode potential, Nernst's equation and its applications, Electro chemical series-applications.

Batteries: primary cells-lithium cells. Secondary cells – Pb-acid storage cell, lithium-ion cells, Fuel cells-hydrogen-oxygen fuel cell. Methanol-oxygen fuel cell-advantages and applications, Reserve batteries - silver peroxide-zinc alkaline cell.

UNIT-II

Water Technology

Introduction, types of hardness, units and Numerical problems. Estimation of hardness of water-EDTA method. Boiler troubles-scales and sludges. Treatment of Boiler feed water-Ion-exchange process. De-salination of brackish water-Reverse Osmosis. Domestic water treatment-specifications and steps involved in the treatment of potable water.

UNIT-III

Corrosion & It's Control Methods

Corrosion: Introduction, causes of corrosion, types of corrosion-dry and wet corrosion-mechanism of electrochemical corrosion. Caustic embrittlement and boiler corrosion. Factors affecting on corrosion and corrosion control methods- cathodic protection (sacrificial anodic protection and impressive current cathodic protection) and surface coatings (anodic and cathodic), Methods of application of metal coatings-Hot dipping (galvanization and tinning) and electroplating of copper.

UNIT-IV

Polymers

Polymers: Introduction to polymers, classification of polymers, mechanism of free radical addition polymerization, properties of polymers-crystallinity, melting point, boiling point and glass transition temperature. Conducting polymers-classification, mechanism of conduction in conducting polymers-poly acetylene and ploy aniline, applications.

UNIT-V

Chemistry of Passive Devices

Resistors: Types of resistors, composition types of resistors- carbon resistor, film type resistor, wire-wound resistor**.**

Capacitors: Electrolytic capacitors family tree, Charge principle, Basic materials and construction.

TEXT BOOKS:

1. Text book of Engineering Chemistry by Jain & Jain.
2. Text book of Engineering Chemistry, CENGAGE learning by Prasanta Rath, B. Ramadevi, Ch. Venkata Ramana Reddy & Subhendu Chakroborty.
3. University chemistry, by B. H. Mahan
4. Engineering Chemistry by Shashi Ch

COURSE OUTCOMES:

The basic concepts included in this course will help the student to gain:

CO1: The knowledge of electrochemical cells, different batteries
CO2: The required principles and concepts of corrosion ,control methods.
CO3: The knowledge of water treatment.
CO4: The knowledge of polymers and their importance in day to day life.
CO5: The required principles and concepts of passive devices.

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VAAGDEVI COLLEGE OF ENGINEERING
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ENGLISH LANGUAGE AND INTERACTIVE COMMUNICATION SKILLS LAB

B. Tech : I-Semester **L/T/P/C**
0/0 /3 /1.5

Pre-requisites: None

The ELICS Labfocuses on the production and practice of sounds of language to familiarize the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning.
- To sensitize students to the nuances of English speech sounds, stress and intonation.
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
- To improve the fluency of students in spoken English and neutralize the influence of the sounds of their mother tongue.
- To train students to use language appropriately for public speaking and interviews.

Course Outcomes:

After the completion of this course, students will be able to –

CO1: understand the nuances of English language through audio-visual experience and group activities.
CO2: speak with clarity and confidence which in turn enhances their employability skills.
CO3: develop their listening skills so that they may appreciate its role in developing LSRW skills language and improve their pronunciation.
CO4: involve the students in speaking activities in various contexts.

SYLLABUS

English Language and Interactive Communication Skills Lab (ELICS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

Module - I

CALL Lab: Understand the essentials of English pronunciation through dialogues and conversations: Listening skill- its importance – purpose- process- types- barriers. Practice: introduction to phonetics – speech sounds – vowels and consonantal phonemes.

ICS Lab: Understand the practicalities in using English in formal contexts: Communication at workplace– spoken vs. written language. Practice: Ice-breaking activity and JAM session– situational dialogues – greetings – taking leave – introducing oneself and others.

Module - II

CALL Lab: Understand the fundamentals of English pronunciation though expressions used in day to day situations: Structure of syllables – word stress and rhythm– weak forms and strong forms in context. Practice: Basic rules of word accent – stress shift – weak forms and strong forms in context.

ICS Lab: Understand and practice non-verbal cues in various situations: Features of good conversation – non-verbal communication. Practice: Situational dialogues – roleplay– expressions in various situations – making requests and seeking permissions – telephone etiquette.

Module - III

CALL Lab:Understand the importance of e-correspondence: The basics– general format –drafting –features of good e-mails– do's and don'ts of e-mail etiquette. Practice: Assignments through e-mails observing e-mail etiquette.

ICS Lab: Apply thestrategies of browsing to make effective oral presentations:Understanding text features, print features – collecting data needed for the presentation – how to make formal presentations. Practice: Formal presentations.

Module – IV

CALL Lab: Identify and differentiate audio text from the given sourcewhile listening to authentic material: Listening for general details about an event / object/ person or a piece of art. Practice: Listening descriptions / discussions / interpretations / comments/ analysis/ evaluations / summaries.

ICS Lab: Understand: Public speaking – exposure to structured talks. Practice: To make an academic talk – extempore.

Module – V

CALL Lab:Understand: Listening for specific details of a survey to fill up the survey sheet.
Practice: Listening to comprehension texts to understand the gist.

ICS Lab: Understand: Debate/group discussionbased on contemporary topic/survey report, interview skills.
Practice: Mock group discussion/mock interviews.

Minimum Requirement of infrastructural facilities for ELICS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.
System Requirement (Hardware component): Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:
i) Computers with Suitable Configuration
ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public-Address System, an LCD and a projector etc.

References:

1. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.
2. Spoken English: A self-learning guide to conversation practice by V Sasikumar and P V Dhamija, Tata McGraw-Hill, 2008.
3. Fundamentals of English Grammar, Third Edition by Betty Schrampfer Azar, Barbara F. Matthies and Shelley Hartle, Longman.
4. Handbook for Technical Writing by David A Mc Murrey & Joanne Buckely CENGAGE Learning 2008.

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VAAGDEVI COLLEGE OF ENGINEERING
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PROGRAMMING FOR PROBLEM SOLVING LAB

B. Tech : I-Semester **L/T/P/C**
0/0 /2 /1

Pre-requisites: None

Course Objectives:

- To provide the necessary knowledge on general engineering problem solving methodologies.
- To provide necessary foundations for step by step computer program development andto present the basic concepts in C programming language.
- To prepare the students to write modular and readable C Programs.
- The Course introduces the essential concepts like abstract data types, user defined data types.
- To analyze the performance of algorithms and how to use such knowledge for later processing with the help of files.
- Aims to train the students to write working programs to solve problems

WEEK-1

Write a C program to find the areas of shapes like circle, square, rectangle and triangle
Write a C program to demonstrate Type Casting and Type Conversion.

WEEK-2

Write a C program to find the roots of a quadratic equation.
Write a C program to find greatest of any 3 numbers.
Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

WEEK-3

Fibonacci sequence is defined as follows: the first and second terms in sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

A positive integer d is said to be a factor of another positive integer N if when N is divided by d, the remainder obtained is zero. For example, for number 12, there are 6 factors 1, 2, 3, 4, 6, 12. Every positive integer k has at least two factors, 1 and the number k itself.Given two positive integers N and k, write a program to print the kth largest factor of N.

Input Format: The input is a comma-separated list of positive integer pairs (N, k).

Output Format: The k^{th} highest factor of N. If N does not have k factors, the output should be 1.

Constraints:

- 1<N<10000000000
- 1<k<600.

You can assume that N will have no prime factors which are larger than 13.

Example

- **Input**: 12,3
- **Output**: 4

Write a C program to find the second largest number in a set of n numbers.

WEEK-4

Write a C program to generate Pascal's triangle.
Write a C program to find the LCM(Least Common Multiple) and GCD (greatest common divisor) of two given integers.
Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

WEEK-5

Write a C program to find sum of series 1+x^1+x^2+x^3+ ..... +x^n using functions.

Write a C program to find factorial of a given number using Recursion.

Write a C program to demonstrate the use of Storage Classes

WEEK-6

Write a C program to find both the largest and smallest number in a list of integers.

N monkeys are invited to a party where they start dancing. They dance in a circular formation, very similar to a Gujarati Garba or a Drum Circle. The dance requires the monkeys to constantly change positions after every 1 second.

The change of position is not random & you, in the audience, observe a pattern. Monkeys are very disciplined & follow a specific pattern while dancing.

Consider N = 6, and an array monkeys = {3,6,5,4,1,2}.

This array (1-indexed) is the dancing pattern. The value at monkeys[i], indicates the new of position of the monkey who is standing at the ith position.

Given N & the array monkeys[ ], find the time after which all monkeys are in the initial positions for the 1st time.

Constraints

1<=t<=10 (test cases)

1<=N<=10000 (Number of monkeys)

Input Format

First line contains single integer t, denoting the number of test cases.

Each test case is as follows -

Integer N denoting the number of monkeys.

Next line contains N integer denoting the dancing pattern array, monkeys[].

Output

t lines,

Each line must contain a single integer T, where T is the minimum number of seconds after which all the monkeys are in their initial position

Write a C program to insert an element at a given position in an Array using functions.

WEEK-7

7. Write a C program to perform all of the following:

a) Matrix Addition and subtraction

b) Matrix Multiplication

c) Find Transpose and test if a matrix is symmetric or not

d) A traditional chess board consists of 8 rows and 8 columns. Write a program to count the number of safest places that a King can be positioned when 3 queens (ministers) are placed at different positions on the chess board.

WEEK-8

Write a C program to perform linear search

Write a C program to perform binary search

Write a C program to sort the elements using bubble sort

WEEK-9

Write a C program to insert a sub-string in to a given main string at a given position.

Write a C program to count number of characters, words and sentences in a given text.

Write a C program to determine if the given string is a palindrome or not.

Write a C program to sort the given names in alphabetical order.

WEEK-10

Write a C program to implement array of structures.(use student structure) and write functions tosearch student data using hall ticket number.

ii. to sort the student records based on the total marks.

Write a menu driven C program that uses functions to perform the following operations on complexnumbers stored in a structure:

i. Reading a complex number
ii. Writing a complex number
iii. Addition of two complex numbers
iv. Multiplication of two complex numbers

Write a C program to demonstrate Unions and enum.

WEEK-11

Write a C program for Pointer Arithmetic.

Write a C program to swap two numbers using Call by value and Call by reference.

Write a C program to demonstrate calling of a function (like add, subtract, multiply) using a function pointer.

WEEK-12

Write a C program using pointer to create a two-dimensional matrix, to input values in to the matrixand to display the matrix and its transpose. Free the memory properly.

Write a C program to demonstrate on structures and pointers.

Write a C program for dynamic creation of structures using pointers

WEEK-13

Write a C program to count no of alphabets, no of digits, no of special symbols, no of white spaces and no of tabs in a given text file.

Write a C program which copies one text file to another text file and verify the correctness.

Write a C program which copies one binary file to another binary file and verify the correctness.

WEEK-14

Write a C program to produce reverse of the content of a text fie into another text file and verify the result.

Write a C program to merge two text files into a third text file (i.e., the contents of the first file followed by those of the second are put in the third file) and verify the correctness.

WEEK-15

Write a command-line C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)

Write a C Program that removes all comment lines from a C source file.

TEXT BOOK:

1. Byron Gottfried, ***"Programming with C"*** . Third Edition(Schaum's Outlines) McGrawHill.

REFERENCE BOOKS:

1. B.A. Forouzanand R.F. Gilberg, *"C Programming and Data Structures"* , Cengage Learning (3rdEdition)
2. Pradip Dey& Manas Ghosh, *"Programming in C"*, 2nd Edition , Oxford University Press,2013.
3. E. Balaguruswamy , *"Programming in ANSI C "* ,McGraw-Hill Education,2008.

COURSE OUTCOMES:

The basic concepts included in this course will help the student to

CO1: Understand basic structure of the C Programming, data types, declaration and usage of variables, control structures and all related concepts.

CO2: Understand any algorithm and Write the C programming code in executable form.

CO3: Implement Programs using functions, pointers and arrays

CO4: Use the pre-processors to solve real time problems.

CO5: Use file structures and implement programs on files.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ENGINEERING AND IT WORKSHOP

B. Tech : I-Semester(common for ECE, EEE, CSE, CSD, & CSM) **L/T/P/C**
0/0 /3 /1.5

Pre-requisites: None

Course Objectives:

- Know the usage of various tools and their application in house wiring and Soldering.
- Identify a particular component from the given group of passive electronic components.
- Know the usage of various Voltage sources and equipment.
- Know the concepts of hardware and assemble and dissemble of computer.
- Know the installation of XP and Linux software.
- Overview of Microsoft word and table formats, Mail-merge concepts, Hyperlink concepts.
- Overview of Microsoft Excel, Functions and formulas.
- Overview of Microsoft PowerPoint , Slides creation, Layouts and insert images
- Overview of Microsoft Access , Creation of Tables , data base
- Information of data analysis functions and concatenate functions.

UNIT-I : TRADES FOR EXERCISES:

1. House – wiring
2. Soldering

UNIT-II : ELECTONIC COMPONENTS AND EQUIPMENTS

1. Passive components: Different types of: resistors, inductors, capacitors, potentiometers, Thermistor, Transformers.
2. Active components: Diode, Zener diode, Varactor diode, LED, Photo diode, BJT, Photo transistor, FET, LDR, Solar cell, Photocell, Optocoupler.
3. Voltage Sources: DC battery,. AC power supply, DC power supply.
4. Measuring Instruments: Different types of Voltmeters, Ammeters, Multimeter, CRO, DSO and Function Generator.

UNIT-III : INTRODUCTION TO COMPUTERS

Block diagram of computer – Memory functions of the CPU along with the configuration of each peripheral. Identify the peripherals of a computer, components in a CPU and its functions. Disassemble and assemble the PC back to working condition. Every student should individually install MS windows and Linux on the personal computer. Students should get connected to their Local Area Network and access the Internet.

UNIT-IV : INTRODUCTION TO MS OFFICE

Overview of Microsoft Word, Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Mail-merge concepts. Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Overview of Microsoft Excel, Description about Spread Sheet, Gridlines, Format Cells, Summation, auto fill, Formatting Text, Cell Referencing, Filters, Formulae in excel – average, std deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function.

Overview of Microsoft PowerPoint, PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting – Images, Clip Art.

Overview of Microsoft Access, Creation of Tables, creation of data base, import or export the data base, hyperlinks to another tools.

UNIT-V: DATA ANALYSIS

Insert tables, Draw the column chart, Pie chart, Line chart, bar Diagrams and also insert Auto functions. Data analysis functions: Concatenate, Len, Count of sell, sum if function, average if condition, find/search techniques, if error function, count ifs function.

Course Outcomes:

CO-1: Know the fundamental knowledge of House wiring and soldering and their usage in real time Applications.
CO-2: Gain knowledge on electronic components and measuring instruments.
CO-3: Use basic concepts of computer hardware for assembly and disassembly.
CO-4: Use Microsoft tools for exercise.

TEXT BOOKS:

1. Workshop Manual – P.Kannaiah / K.L.Narayana/Scitech Publishers.
2. Workshop Manual – Venkat Reddy/BS Publication / 6th Edition.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DIFFERENTIAL CALCULUS AND NUMERICAL METHODS

B. Tech II-Semester (EEE) **L/T/P/C**
3/1 /0 /4

Course Objectives:

To learn

- Methods of solving the applications of differential equations.
- The physical quantity involved in Engineering field related to vector field.
- To apply fundamental theorems of vectors in their applications.
- The importance of numerical methods by identifying the root of an equations and find its approximate value by different techniques.
- Solving initial value problems using numerical methods.

UNIT-I: Ordinary Differential Equations of First Order: Exact, Non-Exact differential equations, linear and Bernoulli's differential equations, Applications: Newton's law of cooling, Law of Natural growth and decay.

UNIT-II: Ordinary Differential Equations of Higher Order: Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, sin ax, cos ax, polynomials in x, e^{ax} V(x); method of variation of parameters.

UNIT-III: Vector Differentiation and Integration: Gradient, Divergence and Curl. Directional derivatives, Scalar potential functions. Solenoidal and Irrotational vector field. Line, surface and volume integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

UNIT-IV: Solutions of algebraic Equations: Introduction, Numerical solution of algebraic and transcendental equations by Bisection Method, Regular-Falsi method, Newton-Raphson's method.

UNIT-V: Numerical Integration and Solution of Ordinary Differentiation: Numerical Integration with Trapezoidal rule, Simpson's 1/3rd rule, Simpson's (3/8) rule, Solutions of first order ordinary differential equations by Taylor's series, Euler's Method, Euler's -Modified Method, Runge-Kutta methods

COURSE OUTCOMES:

On successful completion of this course, students are able to:

CO-1: Apply the fundamental concepts of ordinary differential equations to real time problems.
CO-2: Find the complete solution of a non-homogeneous differential equations and applying its concepts in solving physical problems of Engineering.
CO-3: Analyse line, surface and volume integrals using fundamental theorems.
CO-4: Find a better approximate root of a given equation.
CO-4: Compute the differential equation using numerical techniques.

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Editions, 2012.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Introductory Methods of Numerical Analysis by S.S. Sastry, PHI, 4th Edition, 2005.

REFERENCES

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Numerical Methods for Scientific and Engineering Computations: M.K. Jain, S.R.K. Iyengar, R.K. Jain New Age International Publications.
3. S.L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ELECTRICAL CIRCUITS-I

B. Tech II-Semester **L/T/P/C**
3/1 /0 /4

Course Objectives:

- The course introduces the basic concept of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline.
- The emphasis of this course is laid on the basic analysis of circuits which includes
  - Single phase circuits
  - Magnetic circuits and theorems
  - Network topology

UNIT-I: Introduction to Electrical circuits: Essence of electricity, Electric field electric current, potential difference, E.M.F, electric power Ohm's law, R-L-C parameters, Voltage and Current sources, dependent and independent sources, Source Transformation.

Basics of Circuits

KCL, KVL, network reduction techniques, series, parallel, series-parallel, Star-Delta, Delta Star transformations. Nodal analysis, Mesh analysis, Super node and Super mesh for DC excitations & Problems.

UNIT-II: Single Phase AC Circuits: Voltage & Current relationship for passive elements for different input signals (square, ramp, saw-tooth, triangular), R.M.S, average values and form factor for different periodic wave forms-steady state analysis of R, L, C (in different combination) with sinusoidal excitation – concept of reactance, impedance, susceptance and admittance. Phase and phase difference, concept of power factor, real and reactive power, J-notation, complex and polar forms of representation, complex power & Problems.

UNIT-III:Locus diagram and Resonance:

Locus diagram: Series R-L, R-C, R-L-C and parallel combination with variation of various parameters. Resonance: Series, parallel circuits, concept of bandwidth and Q-factor & Problems.

UNIT-IV: Network Theorems (with D.C and A.C Excitation): Super position, Reciprocity, Norton's, Thevenin's, Maximum power transfer, Milliman's, Tellegen's and compensation theorems and Problems.

UNIT-V:Magnetic Circuits: Magnetic circuits, Faraday's laws of electromagnetic induction – concept of self and mutual inductance, Dot convention, coefficient of coupling, composite magnetic circuits, analysis of series and parallel magnetic circuits & Problems.

COURSE OUTCOMES:

After the course completion, the students are able to:

CO-1: Learn basics of electrical circuits such as laws, transformation and network reduction techniques.
CO-2: Explore the basic principles and concepts involved in AC circuits and analyze power in series and parallel AC circuits
CO-3: Learn the concepts of resonance and the importance of locus diagrams.
CO-4: Understand various network theorems and its applications in electrical circuits.
CO-5: Analyze the series and parallel magnetic circuits with basic magnetic principles and laws of electromagnetic induction.

Text Books

1. Engineering Circuit Analysis by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
2. Network Analysis by A.Sudhakar and Shyammohan S Palli, Tata MC Graw Hill.

References

1. Network Analysis by M.E. Van Valkenberg.
2. Linear Circuit Analysis (time domain, Phasor and Laplace transform approaches) Second edition by Raymond A. Decarlo and Penmin – L in, Oxford University Press. Second edition, 2004.
3. Electrical Circuits Theory by K.Rajeswaram, Pearson Education, 2004.
4. Basic Circuits Analysis by D.R. Cunningham & J.A. Stuller, Jaico Publications.
5. Electrical Circuits by A.Chakrabarthy, Dhanpat Rai & Sons.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

BASIC ELECTRONIC DEVICES

B.Tech: II Semester **L/T/P/C**
3/1 /0 /4

Pre-requisites: None

Objectives:

This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

- To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT,UJT and FET.
- To understand diode as rectifier.
- To understand biasing of BJT.
- To study various types of filter circuits.

UNIT - I:

P-N Junction Diode: Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), define Transition and Diffusion Capacitances, varactor diode, photo diode, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

UNIT-II:

Rectifiers and Filters : The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Inductor Filters, Capacitor Filters, L- Section Filters,π- Section Filters, zener diode as a voltage regulator.

UNIT-III:

Bipolar Junction Transistor: The Junction Transistor, Transistor Construction, BJT Operation, Transistor Current Components, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Transistor as an Amplifier, UJT construction and V-I characteristics.

UNIT-IV:

Transistor Biasing and Stabilization: Operating Point, The DC and AC Load lines, Need for Biasing, Bias Stability, Stabilization Factors, Stabilization against variations in V_{BE} and β, Fixed Bias, Voltage Divider Bias, Thermal Runaway, Thermal Stability.

UNIT-V:

Field Effect Transistor: The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C. Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learing, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford University Press.

REFERENCE BOOKS:

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits - K. Lal Kishore, 2 Ed., 2005, BSP.
4. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 Ed., 2008, TMH.

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Analyze the characteristics of the PN junction diode and Zener diode.

CO2: Design the rectifiers with and without filters for specified DC voltage.

CO3: Illustrate the voltage- current characteristics of Junction Transistor and different configurations of transistor

CO4: Design and analyze the different biasing circuits and amplifier circuits.

CO5: Acquire knowledge about the construction, theory and characteristics of FET and MOSFET.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

PHYSICS

B. TECH- II SEM. (EEE) **L/T/P/C**
3/0 /0 /3

Course Objectives:
The course will develop students' knowledge in/on

- To understand the concepts of solid state physics and their applications
- To study the concepts and working principles of optoelectronics and optical fibers.
- To enrich the fundamental concepts and working principles of lasers in advancement of technology and research.
- To provide sufficient depth in electric fields to relate fundamental physics to practical engineering problems to address new problems.
- To understand various dielectric and magnetic properties of materials

UNIT-I:
Solid state Physics: Formation of energy bands in metals, semiconductors and insulators; intrinsic and extrinsic semiconductors, Fermi energy levels for doped, un-doped semiconductors, P-N junction formation; Tunnel diode, Zener diode

UNIT-II:
Optoelectronics and Optical Fibres: LED, Types of semiconductor photo detectors, working principles and characteristics of PIN diode, Avalanche diode and Solar Cell.
Optical Fibres introduction, Total internal reflection, Acceptance angle and Cone, Numerical aperture, Types of Optical Fibers, step and graded index fibers, losses in optical fibers, applications of optical fibers

UNIT-III:
Lasers: Characteristics of lasers, absorption, spontaneous emission, stimulated emission. Population inversion, Ruby laser, He-Ne laser, CO2 laser, applications of lasers in science, Engineering and Medicine

UNIT-IV:
Electric Fields and Properties: Coulomb's law, Electric flux, Electric flux density, work done, potential difference, Energy density and energy stored in electric field, Current, Current density, Continuity equation. Conductor: point form of Ohm's law. Resistance of conductor, Properties of conductors, Relaxation time.

UNIT-V:
Dielectrics and Magnetic Fields: Dielectric materials: Dielectric constant, Polarization, Mathematical expression for polarization, Dielectric strength. Frequency dependence of dielectric constant, Dielectric Losses and important applications of dielectric materials. Oersted's experiment, Biot-Savart law. Magnetic flux, Magnetic flux density, Magnetization and permeability, Origin of magnetic moment, Dia-, Para- and Ferro- magnetism, B-H curve.

COURSE OUTCOMES:
On successful completion of this course, students are able to:

CO-1	Understands the materials on the basis of energy band gap and its device applications.
CO-2	Describes the characteristics and working of lasers and their use in various fields.
CO-3	Analyse and apply the concepts of Electric Fields for accurate determination of Electric flux, Electric flux density, energy stored in electric fields etc.
CO-4	Apply the concepts of the light propagation in optical fibres in optical communication systems
CO-5	Classify and enumerate the properties of magnetic and Dielectric materials and identifies their role in specific engineering applications.

TEXT BOOKS

1. A Text Book of Engineering Physics, Dr. M.N. Avadhanulu, Dr. P.G. Kshrisagar-S.Chand.
2. Modern Engineering Physics (Vol-I & II), Dr. K. Vijaya Kumar, Dr. S. Chandralingam – S.Chand.
3. Engineering Physics, P.K.Palani Swamy, Scitech Publications.
4. Electric Devices & Circuits - Millman & Halkies.

REFERENCES

1. Haliday and Resnick, Physics-Wiley
2. J. Singh Semiconductor Optoelectronics: Physics and Technology, Mc. Graw-Hill inc (1995).

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ELECTRICAL ENGINEERING PRACTICE LAB

B.Tech II Semester **L/T/P/C**
0/ 0/3/1.5

Prerequisites: None

Course objectives

- To understand the basics of Electrical Engineering.
- To introduce hardware skills such as bread board connections and soldering.
- To introduce various types of wiring.
- To introduce basic understanding of Electrical parameter measurement.

Part A (For Laboratory Examination – Minimum of 6 experiments)

1. Introduction to various equipment used in Electrical Engineering.
2. Study of resistance color coding and assembling on bread board.
3. Series, parallel connection of R, L and C components.
4. Control of two lamps using different switches.
5. Wiring for fluorescent lamp and ceiling fan.
6. Staircase wiring.
7. Preparation of plate or pipe earthing.
8. Preparation of switch board for DOL starter connection for a motor.

Part B (All Experiments)

1. Design a simple electrical circuit on a bread board and solder on general PCB.
2. Measurement of ac signal parameters using cathode ray oscilloscope and function generator
3. Basic Project of choice.

Course Outcomes.

After completion of this course, Students are able to

CO-1: Identify and find the various components and equipment used for electrical engineering applications.
CO-2: Understand the staircase wiring and ceiling fan wiring.
CO-3: Develop the simple electric circuits on bread board and PCB.
CO-4: Understand the earthing connections and DOL starter connection.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

PHYSICS LAB

B. TECH- II SEM. (EEE) **L/T/P/C**
0 / 0/ 2/ 1

Pre-requisites: None

Course Objectives:

The laboratory course will develop student's knowledge in/on...

- Determination of frequency of AC supply by Sonometer
- Determination of the wavelengths, slit widths with high degree of accuracy from diffraction phenomena using conventional light and laser light
- Determination of time constant of RC circuit and optical fibre characteristics.
- Determination of Solar cell, LED and LASER diode etc. characteristics
- Determination of the wavelength and radius of curvature of Plano convex lens using Newton's rings

Name of the Experiment

1	Torsional Pendulum- Determination of rigidity modulus of materials of a wire
2	Determination of energy gap of material of a p-n junction
3	Study of LED diode V-I & P-I characteristics
4	Determination of dispersive power of a material of a prism-spectrometer.
5	Bending losses of optical fibres and evaluation of numerical aperture of a given optical fibre
6	Study of decay charge & determination of time constant of RC circuit
7	Study of characteristics of Solar cell
8	Determination of wavelength of laser source- Diffraction grating
9	Determination of frequency of AC supply - Sonometer
10	Study of LASER diode V-I & L-I characteristics
11	Determination of wavelength and radius of curvature of Plano convex lens using Newton Rings Experiment.
12	Study of P-N diode Characteristics.

Course Outcomes:

CO1: Estimate the frequency of tuning for and AC supply with the help of stretched strings
CO2: Analyze as well as compare the intensity distribution of interference and diffraction patterns
CO3: Draw the characteristics of electrical and electronic circuits and evaluate the dependent parameters
CO4: Explore and understand the applications of semiconducting devices
CO5: Evaluates the wavelength and radius of curvature of Plano convex lens by Newton's rings

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ENGINEERING DRAWING

B.Tech.: I Year II-SEM CIVIL, EEE, ECE, CSE, CSM & CSE **L/T/P/C**
0/0/4/2

Pre-requisites: None

COURSE OBJECTIVES:

- Use of various command, object properties in AUTOCAD
- Learn the basic convention of drawings, dimensioning, scales and conic sections like ellipse, parabola and hyperbola.
- Learn projection of points, lines viewed in different positions.
- Learn projections of plane surfaces and solids viewed in different positions.
- Gain knowledge of sections of solids and their usage in real time applications and conversion of orthographic projection to isometric projection vice-versa.

Unit – I

Chapter-I Introduction to Computer Graphics : Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software -The Menu System, Toolbars Standard, Object Properties, Draw, Modify and Dimension.

Chapter-II Introduction to Engineering Drawing:

Principles of Engineering Graphics and their significance, ISO and ANSI standards for coordinate dimensioning- usage of Drawing instruments, lettering

a. Conic sections including the Rectangular Hyperbola (General method only);
b. Roulettes-Cycloid, Epicycloid, Hypocycloid
c. Involute
d. Scales – Plain, Diagonal and Vernier Scales.

Unit –II Principles of Orthographic Projections in First Angle Projection- Conventions

Projections of Points

Projection of lines: Parallel, Perpendicular, inclined to one plane and inclined to both the planes.

Unit-III

Projection of planes: Plane parallel, perpendicular and inclined to one reference plane. Planes inclined to both the reference planes.

Projection of Regular Solids-Projection of regular solids, Cube, prisms, pyramids, tetrahedron, Cylinder and cone, axis inclined to one plane and both planes, Projections of Regular Solids.

Unit-IV

Projections of Sections and sectional views of right angular solid-Prism, Cylinder, Pyramid, Cone.

Development of surfaces of Right Regular Solids – Prism, Pyramid, Cylinder and Cone.

Unit-V Isometric Projections:

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric views to Orthographic views and Vice-versa, Conventions.

Text Books

1. Agrawal B & Agrawal C.M. (2012), Engineering Graphics, TMH Publications.
2. Bhatt N.D., Panchal V.M. & Ingke P.R., (2014), Engineering Drawing, Charotar Publishing House.

References

1. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers.
2. (Corresponding set of) CAD Software Theory and User Manuals.
3. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
4. Engineering Drawing – P.J.Shan S.Chand Publishers.
5. Engineering Drawing – Johle/Tata McGraw Hill Book Publishers.

COURSE OUTCOMES:

The students will be able to

CO1: Understand various commands, object properties in AUTOCAD
CO2: Analyse the Projections of Points.
CO3: Understand the projections of solids.
CO4: Estimate the use of drawings, dimensioning, scales and conic sections
CO5: Modify the applications of this knowledge in computer graphics.
CO6: Compare the Conversion of Isometric views to Orthographic views
('*' it will be implemented by using an open source (Auto CAD)software)

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

BASIC ELECTRONIC DEVICES LAB
(Common to ECE & EEE)

B.Tech II Semester **L/T/P/C**
0/0/3/1.5

Pre-requisites: None

Course objectives

- This course intends to provide an overview of the principles and operation of electronic components.
- To understand the operation of power supply circuits, rectifiers and voltage regulators.
- To understand the characteristics of the active devices.
- To understand the construction of simple electronic circuits.

Part A (For Laboratory Examination – Minimum of 8 experiments)

1. Forward & Reverse Bias Characteristics of PN Junction Diode
2. Zener diode characteristics & Zener voltage Regulator.
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters.
5. Input & Output Characteristics of Transistor in CB Configuration.
6. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
7. FET characteristics.
8. UJT characteristics.
9. Design of self bias circuit
10. Comparison of performance of self bias and fixed bias circuits.

Part B

Design of any simple real time circuits for example Doorbell, Water level indicator, Timer circuit, waveform generator etc..

Course Outcomes.

After completion of this course Student able

CO1: Demonstrate the characteristics and operation of Semiconductor diodes..
CO2: Analyze different rectifier circuits.
CO3: Demonstrate V-I characteristics of BJT, FET and UJT.
CO4: Design simple electronic circuits.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

GAMES/SPORTS

B.Tech II Semester **L/T/P/C**
0/0/0/0

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ELECTRICAL CIRCUITS – II

B. TECH- III SEM. (EEE) **L/T/P/C**
3/0/0/3

Pre-Requisites: Electrical Circuits –I

Course Objective:

- This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline.
- The emphasis of this course is laid on the basic analysis of circuits which includes locus diagrams, resonance, three phase circuits, transient analysis, Network Parameters, Two port network parameters, filters and Fourier analysis of A.C. Circuits.

UNIT-I:

Three Phase Circuits:

Three phase circuits: Phase sequence – Star and delta connection – Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced 3 phase circuits – Measurement of active and reactive power.

UNIT-II:

Transient analysis:

Transient response of R-L, R-C, R-L-C circuits (Series and Parallel combinations) for D.C. and sinusoidal excitations – Initial conditions – Classical method and Laplace transforms methods of solutions.

Transient response of the above circuits for different inputs such as step, ramp, pulse and impulse by using Laplace transforms method.

UNIT- III:

Network functions and Network Parameters:

Network functions driving point and transfer impedance function networks- poles and zeros –necessary conditions for driving point function and for transfer function

Two port network parameters – Z, Y, ABCD and hybrid parameters and their relations– 2-port network parameters using transformed variables.

UNIT-IV:

Filters and Fourier analysis of A.C. Circuits:

Introduction to filters –low pass – high pass and band pass – RC, RL, filters- constant K and m-derived filters and composite filter design

Fourier analysis of A.C. Circuits – Fourier Theorem, consideration of symmetry, exponential form of Fourier series, line and phase angle spectra, Fourier integrals and Fourier transforms, Properties of Fourier transforms.

UNIT-V:

Network Topology: Definitions – Graph – Tree, Basic cut-set and Basic Tie-set matrices for planar networks – Loop and Nodal methods of analysis of Networks with dependent & independent voltage and current sources - Duality & Dual networks.

Text Books:

1. Engineering circuit analysis – by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th edition.
2. Electric Circuits by A. Chakrabarthy, Dhanipat Rai & Sons.

References

1. Network Analysis by Vanvalkenburg, PHI.
2. Electrical Circuits by David .A.Bell Oxford University Press, 7th Edition.
3. Networks and systems by D.Roy Chowdary, New age international publishers.
4. Network Theory by N.C. Jagan &C.Lakshminarayana, B.S Publications.
5. Electric Circuit theory by K. Rajeswaran, Pearson Education, 2004.
6. Network Analysis by C.K. Mithal, Khanna Publishers.

Course Outcomes: After going through this course, the students are able to

CO1	Understand the basics of network representation, method of analysing the network and duality of network.
CO2	Analyse balanced and unbalanced three phase circuits and measure voltage, current and power in three phase star and delta connections.
CO3	Study the transient response of series and parallel RLC circuits for DC and sinusoidal excitations. Analyse the response for step, ramp, impulse etc., using Laplace transformation
CO4	Study different types of network functions and evaluate the network parameters in two port network using transformed variables.
CO5	Learn about different types of filters and Fourier analysis applied to AC circuits

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

SIGNALS AND SYSTEMS

B.Tech EEE: III Semester **L/T/P/C**
3/0/0/3

Pre Requisites: None

Course Objective:

- This is a core subject, basic knowledge of which is required by all the engineers. This course focuses on.
- To get an in-depth knowledge about signals, systems and analysis of the same using various transforms.

UNIT-I:Signal Analysis and Fourier Series Signal Analysis:
Analogy between Vectors and Signals, Orthogonal Signal Space,Mean Square Error, Orthogonality in Complex functions, Concepts of Basic signals. Signum and Sinc function.
Introduction to MATLAB and generation of Basic signals using MATLAB

UNIT-II: Introduction to Fourierseries:
Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet 's conditions, Trigonometric Fourier Series and Exponential Fourier Series.
Fourier Transforms: Deriving Fourier Transform from Fourier Series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Introduction to Hilbert Transform, and implementation of Fourier transforms using MATLAB

UNIT- III: Laplace Transforms:
Introduction to Laplace Transforms, Concept of Region of Convergence (ROC) for Laplace Transforms, Partial fraction expansion, Inverse Laplace Transform, Properties of L.T, Relation between L.T and F.T of a signal, Solution of Differential Equation Using Laplace Transform, and implementation of Laplace Transforms using MATLAB

UNIT-IV: Signal Transmission Through Linear Systems:
Classification of Systems, Impulse response, Response of a Linear System, Linear Time Variant (LTV) System, Transfer function of a LTI system, Signal bandwidth, System bandwidth, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and Rise time, and verification of linearity and time invariance of the systems using MATLAB

UNIT-V: Convolution and Correlation of Signals:
Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Cross Correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum, Parseval 's Theorem, Power density spectrum, Relation between Auto Correlation function and Energy/Power spectral density function, Relation between Convolution and Correlation. Convolution and Correlation of signals using MATLAB.

Text Books:
1. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 Ed., PHI.

Reference Books:
1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2 Ed.
2. Signals and Systems – Iyer and K. Satya Prasad, Cengage Learning
3. Signals and Systems – A.Rama Krishna Rao – 2008, TMH.
4. Introduction to Signal and System Analysis – K.Gopalan 2009, Cengage Learning.

5. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH International Edition.
6. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, 3 Ed., 2004, PE.

Course Outcomes: After the completion of this course, the students should be able to:

Apply the knowledge of vectors, orthogonal basis to signals.

1. Analyze the spectral characteristics of continuous-time periodic signals using Fourier series.
2. Demonstrate and apply Fourier transform on various signals.
3. Apply the Laplace transform and Fourier transform for the analysis of continuous-time signals.
4. Analyse systems based on their properties and determine the response of LTI system.
5. Understand the concepts of convolution and correlation of signals.

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VAAGDEVI COLLEGE OF ENGINEERING
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ELECTRICAL MACHINES-I

B. TECH- III SEM. (EEE) **L/T/P/C**
3/0/0/3

Pre-Requisites: Electrical Circuits –I & II

Course Objective:

- Electrical machines course is one of the important courses of the Electrical discipline.
- In this course the different types of DC generators and Motors, which are widely used in industry are covered and their performance aspects will be studied.

UNIT – I

Electromechanical Energy Conversion:

Electromechanical Energy Conversion - Forces and torque in magnetic field systems - Energy balance - Energy and force in a singly excited magnetic field system, determination of magnetic force, Co – Energy - Multi excited magnetic field systems.

UNIT – II

D.C. Generators Construction & operation:

D.C. Generators – Principle of operation – Action of commutator – constructional features – armature windings – lap and wave windings – simplex and multiplex windings – use of laminated armature – E.M.F Equation –Problems.

Armature reaction: Cross magnetizing and demagnetizing AT/pole – compensating winding – commutation – reactance voltage – methods of improving commutation.

UNIT – III

Types of D.C Generators & characteristics:

Methods of Excitation – separately excited and self-excited generators – build-up of E.M.F - critical field resistance and critical speed - causes for failure to self-excite and remedial measures. Load characteristics of shunt, series and compound generators. Applications, problems with practical ratings.

Parallel operation of D.C series generators - Use of equalizer bar and cross connection of field windings - Load sharing**.**

UNIT – IV

D.C Motors Operation & Speed control:

D.C Motors – Principle of operation – Back E.M.F. - Torque equation – characteristics and application of shunt, series and compound motors – Armature reaction and commutation. applications, problems with practical Ratings.

Speed control of D.C. Motors: Armature voltage and field flux control methods. Motor starters (3 point and 4 point starters).

UNIT – V

Testing of D.C. machines:

Losses – Constant & Variable losses – calculation of efficiency – condition for maximum efficiency.

Methods of Testing – direct, indirect and regenerative testing – Brake test – Swinburne's test Hopkinson's test – Field's test-separation of stray losses in a D.C. motor test.

Text Books:

1. Electrical Machines – P.S. Bimbra., Khanna Publishers.
2. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers, 3rd edition, 2004.

References

1. Performance and Design of D.C Machines – by Clayton & Hancock, BPB Publishers
2. Electric Machinery – A. E. Fritzgerald, C. Kingsley and S. Umans, Mc Graw-Hill Companies, 5th edition
3. Electromechanical Energy Conversion with Dynamics of Machines – by R. D. Begamudre, New Age International (P) Ltd., Publishers, 2nd edition, 1998.
4. Electric Machines – M. V. Deshpande, PHI Learning Pvt.Ltd.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Evaluate the stored and converted energy and also exerted force in electromechanical energy conversion devices.

CO-2: Able to analyze and design the types of dc generators.

CO-3: Able to select appropriate D.C Generator to meet the requirements of the application in industry.

CO-4: To understand the characteristics and concept s of speed control.

CO-5: Able to Test the performance and select appropriate D.C machine to meet the requirements of the application in industry.

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VAAGDEVI COLLEGE OF ENGINEERING
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ELECTROMAGNETIC FIELDS

B. TECH- III SEM. (EEE) **L/T/P/C**
3/0/0/3

Pre-Requisites: Engineering Physics **&** Electrical Circuits-I & II

Course Objectives:

- The objective of this course is to introduce the concepts of electric field and magnetic fields and their applications.
- Utilized in the development of the theory for power transmission lines and electrical machines.

UNIT-I:

Electrostatics:

Basics of Co-ordinate systems: Rectangular, Cylindrical, Spherical system. Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Electric Potential – Properties of potential function – Potential gradient – Gauss's law – Application of Gauss's Law – Maxwell's first law, div (D) = ρv – Laplace's and Poison's equations. Electric dipole – Dipole moment – potential and EFI due to an electric dipole – Torque on an Electric dipole in an electric field.

UNIT-II:

Dielectrics & Capacitance:

Electric field inside a dielectric material – polarization – Conductor and Dielectric boundary conditions – Capacitance – Capacitance of parallel plates, spherical and co-axial capacitors – with composite dielectrics – Energy stored and energy density in a static electric field.

UNIT-III:

Magnetostatics:

Static magnetic fields – Biot-Savart's law – Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell's second Equation, div(B)=0,

Ampere's law & applications:

Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere's circuital law – Maxwell's third equation, Curl (H)=Jc.

UNIT-IV:

Force in Magnetic fields and Magnetic Potential:

Magnetic force - Moving charges in a Magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors – Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field - Scalar magnetic potential and its limitations – vector magnetic potential and its properties –vector Poisson's equations - Self and Mutual inductance – Neumann's formulae – determination of self-inductance of a solenoid and toroid - mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field.

UNIT-V:

Time Varying Fields:

Time varying fields – Faraday's laws of electromagnetic induction – Its integral and point forms – Maxwell's fourth equation, Curl (E)= $-\partial B/\partial t$ – Statically and Dynamically induced EMFs – Simple problems - Modification of Maxwell's equations for time varying fields – Displacement current and Displacement current density – Power in EM Fields – Poynting Vector and Poynting Theorem.

Text Books:

1. Engineering Electromagnetics by William H. Hayt & John. A. Buck, Mc. Graw-Hill Companies, 7th Edition - 2009.
2. Electromagnetic Fields by Matthew.N.O.Sadiku, Oxford Publications

References

1. Introduction to E-Magnetics by CR Paul and S.A. Nasar, Mc-Graw Hill Publications
2. Engineering Electromagnetics by Nathan Ida, Springer(India) Pvt. Ltd. 2nd Edition
3. Introduction to Electrodynamics" by D J Griffiths, Prentice-Hall of India Pvt.Ltd, 2nd Edition.
4. Electromagnetics by Plonsy and Collin
5. Static and Dynamic Electricity Smyth.
6. Electromagnetics by J P Tewari.
7. Electromagnetics by J. D Kraus Mc Graw-Hill Inc. 4th edition 1992.

Course Outcomes:

After completion of this course the student will be able to -

CO-1: Analyze the relation between the electric field and the magnetic field, about the various laws such as EFI, Potential and other concepts of these fields.

CO-2: Understand the behavior of conductors and dielectrics, their boundary conditions, Maxwell's equations with respect to electrostatics.

CO-3: Understand the magnetic field concepts using Biot-Savart law and Ampere's law.

CO-4: Analyze the relation between two or more conductors when subjected to magnetic fields.

CO-5: Understand the concepts of time varying fields in both electric and magnetic fields and their relationship in evaluating power.

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VAAGDEVI COLLEGE OF ENGINEERING
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PYTHON PROGRAMMING

B. Tech: III- SEM (EEE) **L/T/P/C**
2/0/0/2

Pre-requisites: None

Course Objectives:

The purpose of the course is to make students

- To develop Python programs with conditionals and loops.
- To develop Python functions and call them.
- To develop and use Python data structures – lists, tuples, dictionaries.
- To do input/output with files in Python.
- To get exposure to various problems solving approaches of computer science

UNIT – I

Introduction to Python: What is Python?, What is Python Good For?, Python History, How does Python Execute a Program, Review of a Simple Program, Some of the Basic Commands, Variables, Statements, Input/Output Operations, Keywords, Variables, Assigning values, Standard Data Types, Strings, Operands and operators.

UNIT – II

Understanding the Decision Control Structures: The if Statement, A Word on Indentation, The if … else Statement, The if … elif … else Statement,

Loop Control Statements: The while Loop, The for Loop, Infinite Loops, Nested Loops.

The break Statement, The continue Statement, The pass Statement, The assert Statement, The return Statement.

UNIT – III

Functions- Function Definition and Execution, Scoping, Arguments: Arguments are Objects, Argument Calling by Keywords, Default Arguments, Function Rules, Return Values.

Advanced Function Calling: The apply Statement, The map Statement, Indirect Function Calls, Anonymous Functions.

UNIT - IV

Lists: List, Creating List, Updating the Elements of a List, Sorting the List Elements. Storing Different Types of Data in a List, Nested Lists, Nested Lists as Matrices, List Comprehensions.

Tuples: Creating Tuple, Accessing the Tuple Elements, Basic Operations on Tuples, Functions to Process Tuples, Nested Tuples, Inserting Elements in a Tuple, Modifying Elements of a Tuple, Deleting Elements from a Tuple.

Sets: Creating Set, Basic Operations on Sets, Methods of Set.

Dictionaries: Operations on Dictionaries, Dictionary Methods, Using for Loop with Dictionaries, Sorting the Elements of a Dictionary using Lambdas, Converting Lists into Dictionary.

UNIT – V

Modules: Importing a Module, Tricks for Importing Modules, Packages.

Exceptions and Error Trapping: What is an Exception?, Exception Handling: try..except..else.., try..finally.., Exceptions Nest, Raising Exceptions, Built-In Exceptions.

Files: Working with Files and Directories, File Processing, Controlling File I/O.

Course Outcomes:

CO-1: Defining the fundamentals of writing Python scripts.
CO-2: Expressing the Core Python scripting elements such as variables and flow control structures.
CO-3: Apply Python functions to facilitate code reuse.
CO-4: Extending how to work with lists and sequence data.

CO-5: Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly.

TEXT BOOKS:

1. The Complete Reference-Python by Martin C. Brown, Mc Graw Hill
2. Python Bible- Complete Python Language Reference by Dave Brueck and Stephen Tanner.

REFERENCE BOOKS:

1. Python Programming for Beginners by Adam Stewart
2. Python Essential Reference (3rd Edition) by David M. Beazleyf

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ENGLISH FOR EFFECTIVE COMMUNICATION

B.Tech. III Sem. **L/ T/ P/ C**
2/ 0 / 0 /2

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students. In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. The coursefollows an integrated approach to language teaching. Instructors and students are encouraged to use online, print media and electronic media resources in compliance with the course topics of the prescribed book and make the best use of worksheets, quizzes, presentations, discussions, role plays and assignments.

Course Objectives

The course will enable the students to -

- understand types of reading for different purposes and practice a variety of texts in print and electronic format.
- improve the language proficiency of students in English with an emphasis on vocabulary, grammar, reading and writing skills.
- motivate students to study academic subjects more effectively and critically using the theoretical and practical components of English.
- develop study skills and communication skills in formal and informal situations.

.

Course Outcomes

After completing this course, students will be able to -

CO-1: Skim and scan the digital text to summarize it for future reference.
CO-2: Read the text to make notes according to their needs.
CO-3: Use English language effectively in spoken and written forms.
CO-4: Communicate confidently in various contexts and different cultures.
CO-5: Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

SYLLABUS

Unit 1: Note Making Skills

- Listen to the audio texts on current issues by English speakers and make notes based on the audio text.
- Read the texts in printed format and make notes based on the text.
- Make notes for texts on scientific concepts.
- Read the excerpt, ‘Inventors’ and do the activities on skimming, scanning and information transfer.
- Vocabulary: Word formation – prefixes and suffixes.
- Grammar: Contracted forms of verbs, tense and aspects.

Unit 2: Summarizing Skills

- Watch the given videos on current issues and summarize the information.
- Read the given texts in electronic format to summarize the information.
- Summarize the given texts / videos on scientific concepts by English speakers.
- Read the excerpt, ‘War’ and do the activities on summarizing, and vocabulary building.
- Vocabulary: Homonyms, homophones and homographs.
- Grammar: Subject-verb agreement.

Unit 3: Mind Mapping Skills

- Use mind map techniques to read the text and infer the information using digital tools / through graphical representation.
- Read the excerpt, 'Aliens' and complete the activities on the reading passage.
- Vocabulary: One-word substitutes.
- Grammar: Articles.

Unit 4: Making Oral Presentations

- Train the students to prepare the drafts for the technical events and present to the class.
- Produce visuals using various digital tools for making effective oral presentation.
- Prepare the visuals, audio and text materials based on the four major components.
- Read the excerpt, 'Genetics' and make an oral presentation.
- Vocabulary: Abbreviations and acronyms.
- Grammar: Common errors in tenses.

Unit 5: Drafting Skills

- Letter writing – types – parts - styles – format – appropriate language – model letters.
- Prepare the script for compering for various college events.
- Read the excerpt, 'Sports' and write an essay on the most favourite sport.
- Vocabulary: Technical vocabulary.
- Grammar: Common errors in English.

Prescribed Textbook:

English for Technical Communication by **Sudarshana, N.P. and C. Savitha,** Published by Cambridge University Press.

References:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P. (2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.

Digital tools for mind mapping activities

1. https://www.mindomo.com/
2. https://www.mindmeister.com/
3. https://www.ayoa.com/
4. https://coggle.it/
5. https://www.popplet.com/

Digital tools for the activities on oral presentation

1. https://prezi.com/
2. https://www.clearslide.com/product/presentations/
3. https://wideo.co/
4. https://slidebean.com/
5. https://www.canva.com/
6. https://docs.google.com/presentation/u/0/
7. https://www.powtoon.com/

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ELECTRICAL CIRCUITS LAB

B. TECH- III SEM. (EEE) **L/T/P/C**
0/0/2 /1

Prerequisites: Electrical Circuits-I and II

Course Objectives:

- This course introduces the basic concept of circuits analysis which is the foundation for all subjects of Electrical engineering.
- Analyze the resonance of series and parallel circuits.

List of Experiments

1. Verification of Kirchhoff's laws (KVL & KCL) .
2. Verification of Thevenin's, Norton's Theorems.
3. Verification of Maximum Power Transfer & Tellegen's Theorems.
4. Verification of Superposition and Reciprocity Theorems.
5. Locus Diagrams of RL and RC Series Circuits.
6. Series and Parallel Resonance.
7. Determination of Open circuit and Short circuit parameters of two port networks.
8. Determination of ABCD parameters of two port networks.
9. Verification of Compensation and Milliman's Theorems.
10. Verification of RMS value of complex wave.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Explain the concept of circuit laws

CO-2: Verify network theorems

CO-3: Determine Z, Y and ABCD parameters for a given two port network.

CO-4: `Evaluate the time response and frequency response characteristics of RLC series circuit and their resonance conditions.

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VAAGDEVI COLLEGE OF ENGINEERING
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PYTHON PROGRAMMING LAB

B. Tech: III- Semester **L/T/P/C**
0/0/2/1

Course Objectives:

The purpose of the course is to make students

- To develop Python programs with conditionals and loops.
- To develop Python functions and call them.
- To develop and use Python data structures – lists, tuples, dictionaries.
- To do input/output with files in Python.
- To get exposure to various problems solving approaches of computer science

Week 1:

a. Write a program to perform the arithmetic operators. Find out the student total marks and average

b. Write a program to apply type conversion techniques in python. Convert from string to int, int to float, float to string

Week 2:

a. Write a program to display whether a student passed in a single subject or not using if statement

b. Write a program to display the grade of a student based on the average of 3 subject marks using if-elif statement

Week 3:

a. Write a program to display the reverse of a given number using while loop and for loop

b. Write a program to display the factorial of a given number using while loop and for loop

Week 4:

a. Write a program to display the prime numbers between 2 and n using while loop and for loop

b. Write a program to print the average marks of 10 students using loops(input 3 subjects for each student)

Week 5:

a. Write a program to define a function to display the grade of a student by using positional arguments(rno, sub1,sub2,sub3)

b. Write a program to define a function to display total bill for a shopping by taking customer name and number of items as keyword arguments.

Week 6:

a. Write a program to define a function to calculate the area of a circle using default arguments

b. Write a program to display the reverse of a given number using recursive function.

Week 7:

a. Write a program to convert a decimal number to binary number using a recursive function.

b. Write a program to perform the arithmetic operations using the functions to each operation.(add(),sub(),mul(),div())

Week 8:

a. Write a program to perform bubble sort on a list without using the sort().

b. Write a program to display the elements of a list in reverse order without using the reverse()

Week 9:

a. Write a program to find a student name from the list of students

b. Write a program to perform addition of 2 matrices using nested lists

Week 10:

a. Write a program to perform multiplication of 2 matrices using nested lists

b. Write a program to demonstrate the tuple operations

Week 11:

a. Write a program to create a list and eliminate the duplicate values from the list

b. Write a program to create 2 sets and perform union, intersection, set difference and symmetric difference operations on sets.

Week 12:

a. Write a program to create a student dictionary with the rno as key and a list as the values of a key (name,sub1,sub2,sub3) and display a memo with total, avg, result and grade

b. Write a program to create a package Shapes and perform the area calculation for different shapes(use one function for each shape)

Week 13:

a. Write a program to create a package Calculator and perform various arithmetic operations (use one function for each operation like add(),mul(),sub(),div())

b. Write a program to create module with packages like Shapes and Calculator and import the module into program, access the functions defined the in the module.

Week 14:

a. Write a program to create a file and save the details of a students (rno,name,sub1,sub2,sub3)

b. Write a program to open a file of students and display the students details in tabular format like rno,name,sub1,sub2,sub3,total,avg,result,grade

Week 15:

a. Write a program to perform demonstrate filename not exist exception

b. Write a program to demonstrate the variable not available exception

Week 16:

a. Write a program to demonstrate arithmetic exception

b. Write a program to create a lambda function to display whether a person is eligible for voting or not

Course Outcomes:

CO-1: Expressing the Core Python scripting elements such as variables and flow control structures.

CO-2: Apply Python functions to facilitate code reuse

CO-3: Extending how to work with lists and sequence data.

CO-4: Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly.

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VAAGDEVI COLLEGE OF ENGINEERING
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PROJECT BASED LEARNING - 1

B. TECH-III SEM (EEE) **L/T/P/C**
0/ 0/ 2/1

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

POWER SYSTEMS – I

B. TECH- IV SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-Requisites: None

Course Objective:

- This subject deals with different types of layouts of power generating units and process involved in generating power.
- It gives the detailed study of economic aspects of power system.
- It gives the detailed study of substation layout and under ground cables.

UNIT-I:

Hydroelectric Power Stations:

Elements of hydro electric power station-types-classification of turbines-working principle- efficiency calculation and design principles for Pelton Wheel, Francis and Kaplan turbines-use of these turbines for various head heights-concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies. Numerical problems.

UNIT-II:

Thermal Power Stations:

Coal Fired Thermal Power Stations:

Line diagram of Coal fired Thermal Power Station (TPS) - showing paths of coal handling, condensers, cooling water systems, ash and flue gasses. Types of steam turbines- Impulse Turbine-Reaction Turbine-Brief description of TPS components: Economizers, Boilers, Super heaters, Condensers, Chimney and cooling towers.

Nuclear Power Stations: Definitions - Nuclear Fission and Chain reaction - Nuclear fuels - Principle of operation of Nuclear reactor - Reactor Components: Moderators, Control rods, Reflectors and Coolants - Types of Nuclear reactors - Brief description of PWR, BWR and FBR - Radiation hazards: Shielding and Safety precautions.

Gas Power Stations: Principle of operation and components (Block Diagram Approach Only)

UNIT-III:

Economic aspects of Power generation and Tariff :

Definitions of connected load, maximum demand, base load and peak load plants. Load curve, load duration and integrated load duration curves - load, demand, diversity, capacity, utilization and plant use factors-Numerical Problems. Costs of Generation and their division into Fixed, Semi-Fixed and Running Costs.

Desirable Characteristics of a Tariff Method-Tariff Methods: Flat Rate, Block Rate, two-part, three –part, and power factor tariff methods and Numerical Problems.

UNIT-IV

Substations and Power Distribution Systems:

Classification of substations: Air insulated substations - Gas insulated substations (GIS), Substations layout showing the location of all the substation equipment.

Classification of Distribution Systems - Comparison of DC vs. AC and Underground vs. Overhead Distribution Systems - Requirements and Design features of Distribution Systems radial and ring main systems, different types of A.C distributors with concentrated and distributed loads.

UNIT-V: Underground Cables:

Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core cables, Numerical Problems. Grading of Cables - Capacitance grading. Intersheath grading. Numerical Problems.

Text Books

1. Principles of Power Systems by V.K Mehta and Rohit Mehta S.Chand & Company Ltd., New Delhi 2004.
2. A Text Book on Power System Engineering By Soni, Gupta, Bhatnagar & Chakrabarti, Dhanpat Rai & Co, 1998.

References

1. Electrical Power Generation, Transmission and Distribution by S.N.Singh., PHI, 2003.
2. Electrics Power By S.L.Uppal, Khanna Publishers
3. Power System Engineering- by R.K.Rajput Laxmi Publications (P) Limited, New Delhi 2006.
4. Electrical Power Systems, PSR, Murthy, BS Publications.

Course Outcomes

After the completion of this course, the students should be able to

CO-1: Gain the knowledge on operation of Hydro Electric generation.
CO-2: Acquire and interpret fundamental concepts Thermal generation.
CO-3: Understand various economic aspects of the Power system and tariff.
CO-4: Acquire knowledge on power system distribution systems and substation
CO-5: Understand design of underground cables

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ELECTRICAL MACHINES-II

B.TECH- IV SEM. (EEE) **L/T/P/C**
3/0/0/3

Pre-Requisites: Electrical Circuits- I& II, Electromagnetic Fields & Electrical Machines-I

Course Objectives:

As an extensionof Electrical Machines-I course this subject facilitates

- To study the performance of Transformers and Induction motors which are the major part of industrial drives and agricultural pump sets.
- To know the applications of transformers and induction machines

UNIT-I:

Single Phase Transformers -Construction & operation:

Single phase transformers – constructional details –minimization of hysteresis and eddy current losses – E.M.F equation –operation on no load and on load – phasor diagrams.Equivalent circuit –losses and efficiency –regulation . All day efficiency –effect of variation of frequency & supply voltage on iron losses.

UNIT-II:

Testing of Single Phase Transformer:

OC and SC tests- Sumpner's test- predetermination of efficiency and regulation – Separation of losses test. Parallel operation with equal and unequal voltage ratios.

UNIT-III:

Auto & Polyphase Transformers:

Autotransformers –equivalent circuit – comparison with two winding transformers.

Polyphase transformers –Polyphase connections- Y/Y, Y/Δ, Δ/Y, Δ/Δ, and open Δ. Third harmonics in phase voltages –three winding transformers –teriary windings- determination of Zp, Zs, and Zt transients in switching –off load and on load tap changing, Scott connection.

UNIT-IV:

Polyphase Induction Motors:

Polyphase induction motors-construction details of cage and wound rotor machines-production of a rotating magnetic field - principle of operation - rotor EMF and rotor frequency - rotor reactance, rotor current and PF at standstill and during operation.

Characteristics of Induction Motors:

Rotor power input, rotor copper loss and mechanical power developed and their interrelation-torque equation-deduction from torque equation - expressions for maximum torque and starting torque - torque slip characteristic - equivalent circuit - Phasor diagram - crawling and cogging.

UNIT-V:

Circle Diagram & Speed Control of Induction Motors:

No-load Test and Blocked rotor test –Predetermination of performance-Methods of starting and starting current and Torque calculations.

Speed Control Methods:

Speed control-change of voltage, change of frequency, V/f, injection of an EMF into rotor circuit – Numerical Problems. Induction generator – principle of operation and its role in electrical systems.

Text Books

1. Electrical machines-PS Bhimbra, Khanna Publishers.
2. Electric Machines –by I.J.Nagrath& D.P.Kothari, Tata McGraw Hill, 7th Edition.2009

References

1. Electric machinery - A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies, 5th edition
2. Theory of Alternating Current Machinery- by Langsdorf, Tata McGraw-Hill Companies, 2nd edition.
3. Performance and Design of AC Machines-M.G. Say. BPB Publishers.
4. Electrical Machines – M.V Deshpande, Wheeler Publishing
5. Electrical Machines – J.B. Gupta, S.K. Khataria & Son's Publications

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Understand the concepts and performance of single phase transformer.

CO-2: Test the performance of single phase Transformer.

CO-3: Choose a suitable three phase transformer based on its application and also convert three phase to two phases or vice versa.

CO-4: Understand the concepts of Construction, operation characteristics, testing (concept of circle diagram) and speed.

CO-5: Analyze speed torque characteristics and control the speed of induction motors.

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VAAGDEVI COLLEGE OF ENGINEERING
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ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

B.TECH- IV SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-Requisites: Electrical Circuits **,** Electronic Devices and Circuits, Digital Integrated Circuits Electromagnetic Fields & Electrical Machines

Course Objective:

- Electrical measurements course introduces the basic principles of all measuring instruments.
- It also deals with the measurement of RLC parameters voltage, current Power factor, power, energy and magnetic measurements.

UNIT-I:

Introduction to Measuring Instruments:

Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type – Extension of range of E.S. Voltmeters.

UNIT-II:

Potentiometers & Instrument Transformers:

Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate type's standardization – applications. CT and PT – Ratio and phase angle errors

UNIT-III:

Measurement of Power & Energy:

Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of active and reactive powers in balanced and unbalanced systems.

Single phase induction type energy meter – driving and braking torques – errors and compensations – testing by phantom loading.

UNIT-IV:

D.C & A.C Bridges:

Method of measuring low, medium and high resistance – sensitivity of Wheat-stone's bridge – Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method.

Measurement of inductance- Factor - Maxwell's bridge, Hay's bridge, Anderson's bridge, Owen's bridge. Measurement of capacitance and loss angle - De Sauty Bridge. Wien's bridge – Schering Bridge.

UNIT-V:

Electronic Measurements & Instrumentation

Introduction to electronic measurements-digital voltmeters and multimeters, Phase, Time, Frequency measurement, Oscilloscopes, Error analysis.

Definition of transducers, Classification of transducers, Advantages of Electrical transducers; Principle operation of LVDT and its Applications, Strain gauge and its principle of operation.

Text Books

1. Electrical & Electronic Measurement & Instruments, A.K.Sawhney Dhanpat Rai & Co. Publications.
2. Electrical and Electronic Measurements and Instrumentation, R. K. Rajput, S. Chand & Company Ltd.

References

1. Electrical and Electronic Measurements, G. K. Banerjee, PHI Learning Pvt. Ltd.
2. Electrical Measurements and Measuring Instruments, Golding and Widdis, Reem Publications.
3. Electrical Measurements, Buckingham and Price, Prentice – Hall
4. Electrical Measurements: Fundamentals, Concepts, Applications, Reissland, M.U, New Age International (P) Limited, Publishers.
5. Electrical Measurements and measuring Instruments, E.W. Golding and F.C. Widdis, fifth Edition, Wheeler Publishing.

Course Outcomes:

After going through this student gets knowledge on:

CO-1: Different types of measuring instruments their construction operation and characteristics

CO-2: Resistance voltage current measurements through potentiometers, voltage current measurements through instruments transformers.

CO-3: Power and energy measurements through watt and energy meters with examples.

CO-4: Resistance measurements through DC bridges, capacitance and inductance measurements through AC bridges, different types of transducers.

CO-5: Measurement of frequency and phase through CRO, range extension of measuring instruments and different types of errors & their reduction methods in measuring instruments.

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VAAGDEVI COLLEGE OF ENGINEERING
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OOPS THROUGH JAVA

B. TECH IV-SEM (EEE) **L/T/P/C**
3/0/0/3

Pre-Requisites: Programming for Problem Solving

Course Objectives:

- This course introduces computer programming using the JAVA programming language with object-oriented programming principles.
- The use of Java in a variety of technologies and on different platforms.
- To understand fundamentals of object-oriented programming in Java which includes defining classes, invoking methods, using class libraries.
- Using API to solve real world problems.

UNIT-I

OOP Concepts: OOP Features, OOP Concepts-Data Abstraction, Encapsulation, Inheritance, Polymorphism, Classes and Objects, Procedural and Object Oriented Programming paradigms.

Java Programming: History of Java, Data Types, Variables, Constants, Scope and Life Time of Variable, Operators, Type Conversion and Casting, Conditional Statements, Iterative statements, Break and Continue statements, Access Controls, Arrays, Methods and Constructors, Static variables and Static methods, This reference, Overloading methods, Garbage collection, Nested Classes, and Inner Classes.

UNIT-II

Inheritance: Inheritance - types of Inheritance, Member access rules, Method Overriding, Super keyword, Preventing Inheritance: Final classes and methods.

Interfaces: Abstract class, defining an Interface, Abstract Vs Interface, implementing and extending Interface.

UNIT-III

Packages- Defining, creating and accessing a Package, and importing Packages.

Exception Handling- Exception Handling**,** Types of Exceptions. Usage of try, catch, throw, throws and finally, re-throwing exceptions, and User defined Exceptions.

UNIT-IV

Multi Threading- Creating Thread, Life cycle of Thread, Thread priorities, synchronization of Threads, Inter-Thread Communication.

Collection Framework in Java- Overview of Java Collection Frame work, Generics, Commonly used Collection Classes and Interfaces-Array List, Vector, Hash Table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, Calendar, and Properties.

UNIT-V

GUI Programming with Java- AWT class Hierarchy, Introduction to Swing, Swing vs. AWT, Containers- JFrame, JApplet, and JPanel, Swing components- JButton, JLabel, JTextField, and JTextArea. Layout manager and its types.

Applet: Create an Applet, Life Cycle of an Applet, and passing parameters to Applet.

TEXT BOOKS:

1. Java The Complete Reference, 8th Edition. herbert schildt. Indian edition.

Reference books:

1. Java for Programmers, P.J. Dietel and H.M Dietel,Pearson Education (OR) JAVA: How to Program P.J. Dietel and H.M. Dietel, PHI.
2. Object Oriented Programming through Java, P. Radha Krishna, University Press.
3. Thinking in Java, Bruce Ecel, Pearson Education
4. Programming in Java, S. Malhotra and S. Choudary, Oxford Univ. Press.

Course Outcomes:

CO-1: Understand the use of OOP concepts and solve real world problems using OOP techniques.
CO-2: Solve the inter-disciplinary applications using the concept of inheritance.
CO-3: Develop robust and faster applications by applying different exception handling mechanisms.
CO-4: Understand the multithreading concepts and develop efficient applications.
CO-5: Design GUI based applications and develops applets for web applications.

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VAAGDEVI COLLEGE OF ENGINEERING
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ANALOG AND DIGITAL ELECTRONICS

B. TECH IV-SEM (EEE) **L/T/P/C 3/0/0/3**

Prerequisites: Basic Electronic devices

Course objectives:

To familiarize the student with

- The analysis and design of basic transistor amplifier circuits.
- The characteristics of feedback amplifiers and classification of oscillators.
- The construction of various multivibrators using transistors.
- The operation of operational amplifier and its applications.
- The implementation of simple logical operations using combinational logic circuits.
- The concepts of sequential circuits and to analyze sequential systems in terms of state machines.

Unit 1: Transistor Amplifier:

Small Signal BJT Amplifier, Small Signal analysis, Transistor hybrid pi model, parametric evaluation of conductance and capacitances, single stage amplifier and its frequency responses.

Unit 2: Feedback and oscillator circuits:

Concept of feedback, effect of positive and negative feedback, Feedback topologies: Voltage series, current series, voltage shunt, current shunt, Sinusoidal Oscillators: Hartley oscillator, Colpitts oscillator, RC phase shift oscillator, Wein bridge oscillator, Crystal oscillator

Multivibrators (Without analysis): Astable, Monostable and Bistable multivibrator using transistor.

Unit 3 Operational Amplifier and Applications:

Basics of operational amplifier, Ideal characteristics, Differential and common mode operation, Inverting and non inverting amplifiers, Differential amplifier, Op-amp applications: integrator and differentiator, summing amplifier, Schmitt trigger. Active filters: Low pass, high pass, band pass and band stop.

Unit 4: Digital Circuits:

Digital logic gates: OR, AND, NOT, NAND, NOR, Ex-OR, Ex-NOR, De Morgan law, Basic theorem and properties of Boolean algebra, K-Map method, Logic Families: RTL, DTL, TTL, CMOS and their comparison.

Combinational digital circuits: Binary Adder-Subtractor, Magnitude Comparator, Encoder, Decoder, Multiplexer.

Unit 5 Sequential Logic circuits and A/D & D/A converters:

Storage Elements: SR, JK, D, T and Master Slave flip flop, Race round condition, State reduction and assignment, Shift register, Ripple counters, Synchronous counters.

Digital-to-analog converters (DAC) and Analog to digital converters (ADC): Weighted resistor DAC, R-2R ladder DAC, Single slope ADC and dual slope ADC, successive approximation ADC.

Course outcomes:

After the completion of this course, the students should be able to:

CO-1: Construct and analyze the single stage transistor amplifier.

CO-2: Design and construct the negative feedback amplifiers and oscillators according to the required specifications.

CO-3: Understand the Op Amp and its applications.

CO-4: Design different combinational circuits using minimization techniques.

CO-5: Analyze basic sequential circuits and also able to understand various ADC and DAC techniques.

Text Books:

1. Electronic circuits analysis and design by Donald A Neamen.
2. Linear integrated circuits- D. Roy Chowdhury, New Age Inernational (p) let,
3. Digital Design- Morris Mano, PHI, 3rd Edition.

References Books:

1. Electronic circuit analysis - S. Salivahan, N.Suresh Kumar, A Vallavaraj, 2 Ed., 2009, TMH.
2. Op-amps and linear ics – ramakanth A. Gayakwad, PHI, 2003.
3. Switching Theory and Logic Design – A Anand Kumar, PHI,2013.
4. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rdEdition, Cambridge.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ANALOG AND DIGITAL ELECTRONICS LAB

B. TECH- IV SEM. (EEE) **L/T/P/C**
0/0/3//1.5

Prerequisites: Pulse Digital and Linear Integrated Circuits

Course Objectives

- To design and construct the R-C circuits, clippers, clampers.
- To design and analyze of adder, subtractor using IC741.
- To understand the operations of differentiator and integrator using IC 741
- To design and analyze of active filter.
- To construct and understand of the different multivibrator using IC 555.
- To construct and analyze different waveform generators IC741.
- To understand the operation of VCO using IC 566.

List of Experiments (Minimum of 10 experiments to be performed)

1. Linear Wave Shaping
2. Non Linear Wave Shaping-Clippers
3. Non Linear Wave Shaping-Clamper.
4. OP-AMP Applications – Adder, Subtractor, Comparators.
5. Integrator and Differentiator Circuits using IC 741.
6. Active Filter Applications – LPF, HPF (first order)
7. IC 741 Waveform Generators – Sine, Square wave and Triangular waves.
8. IC 555 Timers – Monostable Multivibrator Circuit.
9. IC 555 Timers – Astable Multivibrator Circuit.
10. Schmitt Trigger Circuit – Using IC 741
11. Design of VCO using IC 566
12. 4-bit DAC using OP-AMP

Course Outcomes: After the completion of this course, the student should be able to

CO-1: Understand the applications of diode as integrator, differentiator, clipper and clamper circuits.
CO-2: Design circuits using operational amplifiers for various applications.
CO-3: Analyze the VCO circuit.
CO-4: Understand and implement DAC conversions using OP-AMP.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ELECTRICAL MACHINES LAB-I

B. TECH- IV SEM. (EEE) **L/T/P/C**
0/0/3/1.5

Prerequisites:
Electrical Circuits I & II,
Electro Magnetic Fields,
Electrical Machines – I.

Course Objectives:
- To introduces concept of rotating machines and principle of the Electromechanical energy conversion
- To understand the functioning of different types of dc machines.
- To estimate losses and estimation of various dc machines.

List of Experiments
1. Magnetization characteristics of DC shunt generator, determination of critical field resistance and critical speed.
2. Load test on DC shunt generator, determination of its characteristics.
3. Load test on DC series generator, determination of its characteristics.
4. Load test on DC compound generator, determination of its characteristics.
5. Hopkinson's test on DC shunt machines, predetermination of efficiency.
6. Fields test on DC series machines, determination of efficiency.
7. Swinburne's test on DC Shunt Machine, predetermination of its efficiency.
8. Speed control of DC shunt motor.
9. Brake test on DC compound motor, determination of performance curves.
10. Brake test on DC shunt motor, determination of performance curves.

Course Outcomes:
CO-1: Select range of apparatus based on the ratings of DC Machines.
CO-2: Determine Characteristics of DC machines by conducting tests.
CO-3: Evaluate the efficiency of the machine by analyzing test results.
CO-4: Study speed control methods for dc machines.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

OOPS THROUGH JAVA LAB

B. TECH IV-SEM(EEE) **L/T/P/C**
0/0/3/1.5

Pre-Requisites: Programming for Problem Solving

Course Objectives:

- This course introduces computer programming using the JAVA programming language with object-oriented programming principles.
- The use of Java in a variety of technologies and on different platforms.
- To understand fundamentals of object-oriented programming in Java which includes defining classes, invoking methods, using class libraries.
- Using API to solve real world problems.

Week 1:

a) Write a program to demonstrate class.
b) Write a program on this keyword.

Week 2:

a) Write a java program on finalize method.
b) Write a java program on nested class.

Week 3:

a) Write a program on parameterized constructor.
b) Write a java program to implement constructor overloading.
c) Write a program on static binding.

Week 4:

a) Write a java program on multilevel inheritance.
b) Write a Java program that illustrates how run time polymorphism is achieved.
c) Write a program using keyword super.

Week 5:

a) Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.
b) Write a program on multiple inheritance using interfaces.

Week 6:

Write a java program that illustrates the following:
a) Creation of simple package.
b) Accessing a package.
c) Implementing interfaces.

Week 7: Write a java program to implement following exception types.
a) try - catch .
b) throw .
c) Multiple exceptions.
d) user defined exceptions.

Week 8: Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

Week 9: Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially there is no message shown.

Week 10: Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

Week 11:

a) Write an applet that displays a simple message.

b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Computer" is clicked.

Course Outcomes: After the completion of this course the students should be able to :

CO-1: Use the Java SDK environment to create, debug and run simple Java programs.

CO-2: Write Java programs to implement error handling techniques using exception handling

CO-3: Develop multithreaded applications with synchronization.

CO-4: Design simple Graphical User Interface applications and event driven programming.

Text Books:

1. Java The Complete Reference, 8th Edition. herbert schildt. Indian edition.

2. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, New Delhi.

Reference Books:

1. Java for Programmers, P.J. Dietel and H.M Dietel,Pearson Education (OR) JAVA: How to Program P.J. Dietel and H.M. Dietel, PHI.

2. Object Oriented Programming through Java, P. Radha Krishna, University Press.

3. Thinking in Java, Bruce Ecel, Pearson Education

4. Programming in Java, S. Malhotra and S. Choudary, Oxford Univ. Press.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

PROJECT BASED LEARNING - 2

B. TECH-IV SEM (EEE) **L/T/P/C**
0/ 0/ 2/1

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ELECTRICAL MACHINES-III

B. TECH-V SEM (EEE) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites:
Electrical Machines-I
Electrical Machines-II

Course Objectives:
- To discuss with the detailed analysis of Alternators
- To introduce the concept of parallel operation of alternators
- To introduce the concept of regulation and its calculations.
- To understand operation, construction and types of single-phase motors and their applicationsin house hold appliances and control systems.

UNIT-I:
Construction and Principle of operation of synchronous machine: Constructional features of round rotor and salient pole machines, Armature windings: Integral slot and fractional slot windings; Distributed and concentrated windings Distribution Pitch and windings factors, E.M.F Equation. Harmonics in generated E.M.F. Superposition of harmonics, Armature reaction, Leakage reactance, Synchronous reactance and impedance, Experimental determination, Phasor diagram, Load characteristics.

UNIT-II:
Regulation of Synchronous generator: Regulation by synchronous impedance method, MMF. Method, Z.P.F. method and A.S.A methods, Salient pole alternators. Two reaction analysis, Experimental determination of Xd and Xq (Slip test) Phasor diagrams, Regulation of salient pole alternators.

UNIT-III:
Parallel operation of Synchronous generators: Synchronizing alternators with infinite bus bars, Synchronizing power torque, Parallel operation and load sharing, Effect of change of excitation and mechanical power input, Analysis of short circuit current waveform, Determination of subtransient, Transient and steady state reactance.

UNIT-IV:Synchronous motors- principle of operation: Theory of operation, Phasor diagram, Variation of current and power factor with excitation synchronous condenser, Mathematical analysis for power developed Power circles: Excitation and power circles - Hunting and its suppression, Methods of starting, synchronous induction motor.

UNIT-V:
Single phase motors Special machines: Single phase Motors: Single phase induction motor-Constructional features Double revolving field theory, Cross Field theory Equivalent Circuit - Split phase motors – Capacitor start Capacitor run motors, shaded pole motor. Principle of A.C. Series motor-Universal motor, Stepper motor, Schrage Motor, BLDC Motor, PMDC and Reluctance Motor. (Qualitative Treatment only).

Text Books:
1. Electrical Machines – by P.S. Bimbra, Khanna Publishers, 7th Edition, 2011.
2. Electric Machines- by I.J. Nagrath& D.P. Kothari, Tata Mc Graw-Hill Publishers, 3rd Edition 2006.
Reference Books:
1. Performance and Design of AC Machines, MG. Say, BPB Publishers
2. Electrical Machines by MulukutlaS.Sarma, Mukesh K. Pathak, Cengage Learning, 2009.

3. Electric Machinery – by A.E. Fitzgerald, C.Kingsley and S.Umans,Mc Graw-Hill Companies, 5th edition, 1990.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Demonstrate basic concepts of AC machines.

CO2: Analyze the concepts of regulation of synchronous generators.

CO3: Evaluate performance characteristics of synchronous machines.

CO4: Analyze the operating characteristics of synchronous motors.

CO5: Identify the Construction, operation and characteristics of single-phase motor and special machines

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
POWER ELECTRONICS

B. TECH: V-SEMESTER

L/T/P/C
3/0/0/3

Prerequisites:
Electrical Circuits-I
Electrical Circuits-II
Basic Electronic Devices

Course Objectives:

- To Design/develop suitable power converter for efficient control or conversion of power in driveapplications
- To Design / develop suitable power converter for efficient transmission and utilization of power in power system applications

UNIT-I:
Power Switching Devices: Power Diode, Thyristors–Silicon controlled rectifiers (SCR's) –Basic theory of operation of SCR– Static characteristics and Dynamic characteristics of SCR – Turn on and turn off methods— Snubber circuit design– Characteristics of power MOSFET and power IGBT–Basic requirements of gating circuits for SCR, IGBT and MOSFET.

UNIT–II: Single-Phase AC-DC Converters: Single-phase half wave-controlled rectifiers – R load and RL load with and without freewheeling diode – Single-phase full wave-controlled rectifiers bridge configuration- R load and RL load with and without freewheeling diode – RLE load with rectification mode and inversion mode – Single-phase semi -controlled rectifiers. Effect of source inductance in single-phase fully controlled bridge rectifier with continuous conduction.

UNIT–III:
Three Phase AC-DC Converters: Three-phase half wave-controlled rectifier with R and RL load – Three-phase fully controlled rectifier with R and RL load – Three-phase semi-controlled rectifier with R and RL load. Effect of source inductance in three-phase fully controlled bridge rectifier with continuous conduction. Basics of Dual Converters.

UNIT–IV
DC–DC Converters: Time-Ratio and Current Limit control- Analysis of Buck, Boost and Buck-Boost converters in Continuous Conduction Mode (CCM)– Output voltage equations using volt-sec balance output voltage ripple & inductor current, ripple for CCM only.

UNIT – V:
DC–AC Converters and AC-AC Regulators: DC–AC Converters Single- phase half bridge and full bridge inverters with R and RL loads – three-phase square wave inverters – 120^0 conduction and 180^0 conduction modes of operation – PWM inverters – Quasi-square wave pulse width modulation – Sinusoidal pulse width modulation. Basics of series and parallel inverters.
AC-AC Regulators Static V-I characteristics of TRIAC and modes of operation – Single-phase AC-AC regulator phase angle control with R and RL load – For continuous and discontinuous conduction- Concept of single-phase cyclo-converter.

Text Books:
1. Power Electronics: Circuits, Devices, and Applications by M. H Rashid, Pearson Education India,2009.

2. Power Electronics: Converters, Applications and Design- by N. Mohan and T. M. Undeland, JohnWiley& Sons, 2007.

References:

1. Fundamentals of Power Electronics- by R. W. Erickson and D. Maksimovic, Springer Science & Business Media, 2007.
2. Power Electronics – by P. S. Bhimbra, Khanna Publications,2012.
3Power Electronics: Essentials and Applications by- L.Umanand, Wiley India, 2009.
4. Power Electronics,- by TataM.D. Singh and K.B. Kanchandhani Mc Graw Hill, 2017.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Understand the differences between signal level and power level devices.
CO2: Examine single phase-controlled rectifier circuits.
CO3: Understand three phase-controlled rectifier circuits.
CO4: Learn the operation of DC-DC choppers.
CO5: Study the operation of DC-AC converters and AC-AC voltage regulators.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
CONTROL SYSTEMS

B. TECH- V SEM. (EEE) **L/T/P/C**
3/0/0 /3

Prerequisites:
Physics
Electrical Circuits-I&II

Course Objectives:

- To understand the different ways of system representations such as Transfer function representation and state space representations and to assess the system dynamic response.
- To assess the system performance using time domain analysis and methods for improving it.
- To assess the system performance using frequency domain analysis and techniques forim proving the performance.
- To design various controllers and compensators to improve system performance**.**

UNIT-I:
Introduction Concepts of Control Systems: Open Loop and closed loop control systems and their differences Different examples of control systems- Classification of control systems, Feedback Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions-Translational and Rotational mechanical systems. Transfer function representation Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.

UNIT-II:
Time Response Analysis: Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT-III:
Stability Analysis: The concept of stability – Routh- Hurwitz stability criterion – Absolute stability and conditional stability. Root Locus Technique: The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci. Frequency Response Analysis: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT-IV:
Stability Analysis in Frequency Domain: Polar Plots, Nyquist Plots and applications of Nyquist criterion to find the stability–Effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagrams. Classical Control Design Techniques: Compensation techniques – Lag, Lead, and Lead-Lag Controllers design in frequency Domain, PID Controllers- Numerical Problems.

UNIT-V:
State Space Analysis of Continuous Systems: Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization - Solving the Time

invariant state Equations- State Transition Matrix and its Properties. Concepts on Controllability and Observability.

Text Books:

1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.
2. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John Wiley and Sons.

References:

1. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition,1998.
2. Control Systems Engg. by NISE 3rd Edition – John wiley
3..Solutions and Problems of Control Systems by A.K.Jairath, CBS Publications,1992.
4. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Understand the concept of feedback and analyze the control system components by theirMathematical modeling.

CO2: Estimate the time domain specifications and steady state error.

CO3: Apply various time domain and frequency domain techniques to assess thesystem performance.

CO4: Improve the system performance by designing a suitable controller and/or a compensator for a specific application.

CO5: Test system Controllability and Observability using state space representationand applications of state space representation to various systems.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
POWER SYSTEMS – II

B. TECH- V SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-Requisites:
Electrical Circuits-I & II
Electromagnetic Fields
Power Systems-I

Course Objectives:

- To analyze the performance of transmission lines.
- To understand the voltage control and compensation methods.
- To know the methods of overvoltage protection and Insulation coordination of transmissionLines.
- To know the symmetrical components and fault calculation analysis.

UNIT-I:

Power system components and Transmission Line Parameters: Basic components of a power system, Single line diagram - Types of Conductors, Inductance and capacitance of single phase and three phase lines, concept of self GMD (GMR), Mutual GMD, double circuit line, inductance of composite conductors, transposition, Numerical problems, Effect of earth on capacitance.

UNIT-II:

Performance of Short and Medium Transmission Lines: Classification of Transmission Lines - Their model representations - Nominal-T, Nominal-Pie representation of Medium and Long Transmission lines - A, B, C, D Constants for all lines, Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems.

UNIT-III:

Long Transmission Line Parameters and Power System Transients: Long Transmission Line-Rigorous Solution, Interpretation of the Long Line Equations, Incident, Reflected and Refracted Waves - Surge Impedance and SIL of Long Lines - Numerical Problems Wave Length and Velocity of Propagation of Waves - Types of System Transients - Travelling wave on transmission line - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of lines with different types of conditions - Open Circuited Line, Short Circuited Line, T-junction, Lumped Reactive Junctions - Bewley's Lattice Diagrams - Numerical Problems

UNIT-IV:

Effects and Concept of Sag in overhead Transmission system : Skin effect and Proximity effect - Description and effect on Resistance of Solid Conductors. Ferranti effect - Charging Current - Effect on Regulation of the Transmission Line. Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference. Types of Insulators, String efficiency and Methods for improvement voltage distribution, calculation of string efficiency - Capacitance grading and Static Shielding - Numerical Problems

UNIT-V:

Power Factor and Voltage control: Causes of low P.F, methods of improving P.F, Static Capacitor and Synchronous CondensersPhase Advancers, most Economical P.F. for constant

KW load and constant KVA type loadsVoltage Control, Shunt Capacitors, Series Capacitors and their location in the Power System

Text books:

1. Electrical power systems-by C.L. Wadhwa New Age International (P) Limited, Publishers, 1998.
2. A Text Book on Power System Engineering by- M.L. Soni, P.V.Gupta, U.S. Bhathnagar, A. Chakrabarthy,Dhanpat Rai & Co Pvt. Ltd, 2008

References:

1. Modern Power System Analysis- by I.J. Nagaraj and D.P. Kothari, Tata McGraw Hill, 2nd Edition.
2. Power system AnalysisJohn-by J Grainger William and D Stevenson, TMC Companies, 4th edition.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Gain knowledge on computing transmission line parameters like inductance and capacitance.

CO2: Evaluate performance of short, medium transmission lines

CO3: Evaluate performance of long transmission lines and describe travelling wave and transients in power system

CO4: Describe various effects on transmission system and compute sag on overhead transmission system.

CO5: Gain knowledge on power factor and voltage control in transmission system.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

RENEWABLE ENERGY SYSTEMS
(PROFESSIONAL ELECTIVE-I)

B. TECH- V SEM. (EEE) **L/T/P/C**
3/0/0 /3

Prerequisites:
Physics
Chemistry
Power Systems-I

Course Objectives:

- To introduce to the technology of renewable sources of energy.
- To learn about the solar radiation, its applications and radiation measuring instruments.
- To study the Geothermal biomass energy resources, biomass systems.
- To learn the methods of energy extraction from the wind and oceans.
- To learn to the technology of direct energy conversion methods.

UNIT – I:
Principles of Solar Radiation: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extra-terrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and sunshine, solar radiation data for India.

UNIT-II:
Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors, tracking CPC and solar swing Solar Energy Storage and Applications: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion, applications of PV system-PV hybrid systems

UNIT-III:
Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria, analysis of aerodynamic forces acting on blade, applications. Biomass: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Biogas digesters, gas yield, combustion characteristics of biogas, utilization for cooking, biomass resource development in India.

UNIT-IV:
Geothermal Energy: Structure of earth's interior- geothermal sites- earthquakes & volcanoes- geothermal resources- hot springs-steam ejection- principle of working- types of geothermal station with schematic representation site selection for geothermal power plants Ocean Energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT-V:
Direct Energy Conversion: Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, seebeck, peltier and joule Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect,

magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law, thermodynamic aspects, selection of fuels and operating condition

Text books:

1. Non-Conventional Energy Sources by G.D. Rai, Khanna Publishers, 4th edition, 2008
2. Suhas.P.Sukhatma and Nayak.J.K., "solar Energy", TMH, New Delhi, 3rdedition, 2008

References:

1. D.P.Kothari and Rakesh Ranjan and K.C. Singal., "Renewable energy resources and emerging technologies"Prentice Hall of India Pvt.Ltd., 2ndEdition, 2011
2. Non-Conventional Energy Systems K Mittal, A H Wheeler Publishing Co Ltd,1999

Course outcomes:

On successful completion of this course, students are able to:

CO1: Apply the technology to capture the energy from the renewable sources like sun, wind,ocean,biomass, geothermal.
CO2: Use different renewable energy sources to produce electrical power.
CO3: Minimize the use of conventional energy sources to produce electrical energy.
CO4: Identify the fact that the conventional energy resources are depleted.
CO5: Explore the direct energy sources.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INDUSTRIAL INSTRUMENTATION
(PROFESSIONAL ELECTIVE-I)

B. TECH- V SEM. (EEE) **L/T/P/C**
3/0/0 /3

Prerequisites:
Electrical Measurements and Instrumentation

Course Objectives:
- To know about transducers and stain gauge and strain measurements.
- To introduce various measurement techniques instruments used in industry.

Unit-I:
Transducers: Introduction to instrumentation system, static and dynamic characteristics of an instrumentation system, Principles and classification of transducers, Electrical transducers, basic requirements of transducers

Unit-II:
Strain Gauge and Strain Measurement: Factors affecting strain measurements, Types of strain gauges, theory of operation of resistive strain gauge, gauge factor, types of electrical strain gauges, strain gauge materials, gauging techniques and other factors, strain gauge circuits and temperature compensation, applications of strain gauges.

Unit-III:
Displacement Measurement: Resistive potentiometer (Linear, circular and helical), L.V.D.T., R.V.D.T. and their characteristics, variable inductance and capacitance transducers, Piezo electrical transducers-output equations and equivalent circuit, Hall effect devices and Proximity sensors, large displacement measurement using synchros and resolvers, Shaft encoders.

Unit-IV:
Temperature Measurement: Resistance type temperature sensors – RTD &Thermister, Thermocouples & Thermopiles, Laws of thermocouple – Fabrication of industrial thermocouples – Signal conditioning of thermocouples output - Radiation methods of temperature measurement – Radiation fundamentals – Total radiation & selective radiation pyrometers – Optical pyrometer – Two colour radiation pyrometers

Unit-V:
Digital Data Acquisition systems & control: Use of signal conditioners, scanners, signal converters, recorders, display devices, A/D & D/A circuits in digital data acquisition. Instrumentation systems. Types of Instrumentation systems. Components of an analog Instrumentation Data – Acquisition system. Multiplexing systems. Uses of Data Acquisition systems. Use of Recorders in Digital systems. Digital Recording systems. Modern Digital Data Acquisition system. Analog Multiplexed operation, operation of sample Hold circuits.

Text Books:
1. Industrial Instrumentation & Control by S. K. Singh. TMH Publication, 2nd edition, 2007
2. Electrical and Electronics Measurement and Instrumentation, By A. K. Shawney, Dhanpatrai&sonspublications.

References:

1. Principles of Industrial Instrumentation, D Patranabis, 3rd edition, Mc Graw hill

Course outcomes:

On successful completion of this course, students are able to:

CO1: Get knowledge on transducers.
CO2: Understand the strain gauge and strain measurement.
CO3: Know the displacement measurement techniques.
CO4: Understand the temperature measurement.
CO5: Gains knowledge on digital acquisition systems and control.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

COMPUTER ORGANIZATION
(PROFESSIONAL ELECTIVE-I)

B. TECH- V SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre Requisites: None

Course Objectives:

- To discuss the basic concepts and structure of computers .
- To understand the concepts of register transfer logic .
- To explore the memory organization & I/O organizations.
- To explain different types of addressing modes.
- To learn different types of serial communication techniques.

UNIT I

Basic Structure Of Computers: Computer Types, Functional unit, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Data Representation: Fixed Point Representation, Floating - Point Representation.

Computer Arithmetic: Addition and subtraction, Multiplication Algorithms, Division Algorithms, Floating - point Arithmetic operations.

UNIT II

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer Bus and memory transfers, Arithmetic micro operations, Logic micro operations, Shift micro operations, Arithmetic logic shift unit, Instruction codes, Computer Registers, Computer instructions-Instruction cycle, Input - Output and Interrupt, STACK organization,Instruction formats, Addressing modes, Data Transfer and manipulation, Program control.

UNIT III

Micro Programmed Control: Control memory, Address sequencing, micro program example, design of control unit, hard wired control, Micro programmed control.

UNIT IV

The Memory System: Basic concepts of semiconductor RAM memory, Read-only memory ,Cache memory, performance considerations, Virtual memory, secondary storage, Introduction to RAID.

Input-Output Organization : Peripheral Devices, Input-Output Interface, Asynchronous data transfer ,Modes of Transfer,Priority Interrupt , Input -Output Processor (IOP), Serial communication; Introduction to peripheral component, Interconnect (PCI) bus, Introduction to standard serial communication protocols like RS232, USB.

UNIT V

Pipeline and Vector Processing: Parallel processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Multiprocessors:Characteristics of multiprocessors, Interconnection Structures, Interprocessor Arbitration. Inter Processor Communication and Synchronization.

TEXT BOOKS:

1. Computer Organization – Carl, Hamacher, Zvonko Vranesic, Sofwatzaky, 5th Edition Mcgraw hill.
2. Computer Systems Architecture – M. Morris Mano III rd Edition Pearson.

REFERENCES:

1. Computer Organization and Architecture-William Stallings Sixth Edition, Pearson/PHI

2. Structured Computer Organization - Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, Sivaraama Dandamudi springer Int, Edition
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

COURSE OUTCOME:

Upon completion of this course, the students will be able to:

CO1: Describe the fundamental organization of a computer system.

CO2: Understand the concepts of register transfer logic and arithmetic operations.

CO3: Understand the concepts of Hardwired control and micro programmed control.

CO4: Explain the I/O and memory organization in depth .

CO5: Understand the concepts of parallel processing, pipelining and inter processor communication.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ELECTRICAL MACHINES LAB – II

B. TECH- V SEM. (EEE) **L/T/P/C**
0/0/2 /1

Prerequisites:
Electrical Machines-II& III

Course Objectives:

- To evaluate the principles and working of all static and rotating AC machines.
- To understand testing of transformers.
- To estimate the performance of AC machines and identify their applications.

List of Experiments:

1. Open Circuit & Short Circuit tests on single phase Transformer.
2. Sumpner's test on a pair of single phase Transformers.
3. Brake test on three phase Induction Motor.
4. No Load & Blocked rotor tests on three phase Induction Motor.
5. Regulation of three phase Alternator by synchronous impedance and MMF methods
6. 'V' & inverted 'V' curves of a three phase Synchronous Motor.
7. Equivalent circuit of a single phase Induction Motor.
8. Determination of Xd&Xq of a Salient pole Synchronous Machine.
9. Scott connection of Transformers.
10. Load test on a three phase Alternator

Course Outcomes:
On successful completion of this course, students are able to:
CO1: Select range of apparatus based on the ratings.
CO2: Draw the Equivalent circuits and analyze various AC machines
CO3: Determine performance and Characteristics of AC machinery
CO4: Evaluate the efficiency of the machine by analyzing test results.
CO5: Evaluate the performance of transformers.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION LAB

B. TECH- V SEM. (EEE) **L/T/P/C**
0/0/2 /1

Prerequisites:
Electrical Measurements and Instrumentation

Course Objectives:
- To introduce the basic principles of all measuring instruments
- To know the measurements of RLC parameters
- To know the measurement voltage, current, power, power factor & energy

List of Experiments:
1. Calibration and Testing of single phase Energy meter.
2. Calibration of Dynamometer power factor meter.
3. Kelvin's double bridge – Measurements of resistance – Determination of Tolerance.
4. Measurement of Capacitance and Inductance using Schering & Anderson Bridge.
5. Measurement of 3-phase Reactive power with single phase Wattmeter.
6. Measurement of parameters of Choke coil using 3-voltmeter& 3-ammeter methods.
7. Calibration LPF wattmeter – by Phantom Loading.
8. Measurement of 3-phase power with single wattmeter and 2 C.T.'s.
9. Resistance strain gauge – strain measurements and calibration.
10. LVDT– characteristics and calibration.

Course Outcomes:
On successful completion of this course, students are able to:
CO1: Compare performance of MC, MI and Dynamometer types of measurements, Energy meter.
CO2: Determine the circuit parameters using AC and Dc bridges.
CO3: Compute the errors CT's and PT's.
CO4: Understand the performance of industrial instruments.
CO5: Determine the LVDT characteristics

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ELECTRICALSIMULATION LAB

B. TECH- V SEM. (EEE) **L/T/P/C**
0/0/2 /1

Pre-Requisites:
Electrical Circuits- I & II
Control Systems
Power Electronics
Power Systems- II

Course Outcomes:

- To get the Simulation Knowledge about concepts on Time Response & frequency response Analysis

List of Experiments:

1.Simulate the given circuit to validate superposition and reciprocity theorems.
2.Simulate the given AC & DC circuits to validate maximum power transfer theorems.
3. Simulate the given AC & DC circuits for steady state conditions using PSPICE and SIMULINK
4. Simulate the given AC & DC circuits for transient state conditions using PSPICE and SIMULINK
5. Determine the time response of the given first and second order systems.
6. Determine the stability of given dynamical system using root locus and bode plot.
7. Calculate the effective inductance and effective capacitance for a given transmission line.
8. Calculate the sending end voltage, current, power and power factor for
    a) Short transmission line
    b) Nominal Pi
    c) Exact transmission line equation
    d) approximation of exact equation
9. Simulate the given single phase full converter for RL load using PSPICE and SIMULINK
10. Simulate the given buck converter for RL load using PSPICE and SIMULINK

Course Outcomes:

On successful completion of this course, students are able to:
CO1: Get the knowledge simulation of electrical circuits
CO2: Observe the time response analysis in simulation
CO3: Know the transmission line parameters using Simulink
CO4: Know the simulation power electronic converters.
CO5: Get the knowledge on different simulation software.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

PROJECT BASED LEARNING - 3

B. TECH- V SEM. (EEE) **L/T/P/C**
0/0/2 /1

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

HUMAN VALUES AND PROFESSIONAL ETHICS

B. TECH- VI SEM. (EEE) **L/T/P/C**
2/0 /0 /0

Pre-Requisites: Nil

Course Objectives:

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

Unit-1 Human Values: Morals, values, ethics – integrity – work ethics – service learning – civic virtue – respect for others – living peacefully – Caring – sharing – honesty – courage – valuing time – cooperation – commitment – empathy – self-confidence – spirituality – character.

Unit II Professional Ethics: Profession and professionalism – Two models of professionalism – Professional etiquette – Three types of Ethics or morality Responsibility in Engineering standards – Engineering Ethics – Positive and Negative faces.

Unit III Professional Responsibilities: Ethical standards Vs Professional Conduct – Zero Tolerance for Culpable Mistakes – Hazards and Risks- Risk benefit analysis-congeniality, collegiality and loyalty. Respect for authority – conflicts of interest – occupational crime.

Unit IV Professional Rights: Professional rights and employee rights communicating risk and public policy – Whistle blowing – Collective bargaining. Professionals /engineers as managers, advisors, experts, witnesses and consultants – moral leadership-

Unit V Ethics in global context: Global issues in MNCs-Problems of bribery, extortion, and grease payments – Problem of nepotism, excessive gifts.

Course Outcomes

CO 1: It ensures students sustained happiness through identifying the essentials of human values and skills.
CO 2: It facilitates a correct understanding between profession and happiness.
CO 3: It helps students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
CO 4: Ability to develop appropriate technologies and management patterns to create harmony in professional and personal life.

PRESCRIBED BOOK:

1. Aryasri, Human Values and Professional Ethics, Maruthi Publications.

SUGGESTED BOOKS:

1. S B George, Human Values and Professional Ethics, Vikas Publishing.
2. S K Chakraborthy & D Chakraborthy: Human Values and Ethics, Himalaya.
3. . M. Govindarajan, S. Natarajan, & V.S. Senthilkumar: Engineering Ethics (Includes Human Values), HI Learning Pvt. Ltd., New Delhi -110001.

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VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

COMPUTER METHODS IN POWER SYSTEMS

B. TECH- VI SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-Requisites:
Electrical Circuits I & II
Power System I & II

Course Objectives:

- To know the preparation of network matrices and Y-bus for a given power system.
- To know the computation of bus voltages of a given power system.
- To acquire the knowledge on symmetrical components, fault analysis and Stability analysis.

UNIT I:
Incidence and Network Matrices: Introduction, graphs, incidence matrices, primitive matrices, types of network matrices, formation of network matrix, π- representation of off-nominal tap transformers, Y-bus formation by singular transformation, Formation of Ybus by inspection method-numerical examples.

UNIT II:
Power Flow Analysis: Importance of power flow analysis in planning and operation of power systems - statement of power flow problem - classification of buses - development of power flow model in complex variables form - iterative solution using Gauss-Seidel method - Q-limit check for voltage-controlled buses – power flow model in polar form - iterative solution using Newton-Raphson method. Newton's Decoupled load flow method and Fast Decoupled load flow method- Numerical Problems.

UNIT-III:
Per unit system and Symmetrical Components: Per-Unit System of Representation. Per-Unit equivalent reactance network of a three-phase power system, Numerical problems.
Symmetrical Component Theory: Symmetrical Component Transformation, Positive, Negative and Zero Sequence components: Voltages, Currents and Impedances. Sequence Networks: Positive, Negative and Zero sequence Networks, Numerical Problems.

UNIT IV:
Fault Analysis: Symmetrical fault Analysis: Short circuit current and MVA calculations, fault levels, Application of Series Reactors, Numerical Problems
Unsymmetrical Fault Analysis: LG, LL, LLG faults with and without fault impedance, Numerical Problems.Z-bus building algorithm - fault analysis using Z-bus Open Circuit and Short Circuit faults.

UNIT V:
Stability Analysis: Importance of stability analysis in power system planning and operation - classification of power system stability - angle and voltage stability – Single Machine Infinite Bus (SMIB) system: Development of swing equation - equal area criterion - determination of critical clearing angle and time for transient stability – solution of swing equation by, step by step method of solution, factors affecting transient stability.

Text books:
1. Modern Power system Analysis by- ,I J Nagrath& D P Kothari, Tata McGraw-Hill Publishing Company, 2nd Edition.
2. Computer Techniques in Power System AnalysisbyM A Pai, TMH Publications.
3. Power system analysis and design by B.R.Gupta, S.CHAND publications.
4.Stagg , El Abiad, " Computer Methods In Power System". Tata McGraw-Hill.1968.

References:

1.Computer techniques and models in power systems by-K Umarao I K International Pvt. Ltd.
2.Power System Analysis by - Grainger and Stevenson, Tata McGraw-Hill, 3rd Edition, 2011.
3.Power system Analysis Operation and control by Abhijit Chakrabarthi and Sunita Haldar 3rd Edition, PHI, 2010.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Determine the bus impedance and admittance matrices for power system network.
CO2: Calculate various parameters at different buses using load flow studies.
CO3: Discuss per unit system representation and symmetrical component theory.
CO4: Discuss fault analysis on power system.
CO5: Understand the steady state stability of power system and analyse the transient stability of power system.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

POWER SEMICONDUCTOR DRIVES

B. TECH- VI SEM. (EEE) **L/T/P/C**
3/0/0 /3

Prerequisites:
Electrical Machines I, II & III
Power Electronics

Course Objectives:
- To introduce the drive system and operating modes of drive and its characteristics
- To understand Speed – Torque characteristics of different motor drives by various powerconverter topologies
- To appreciate the motoring and braking operations of drive
- To differentiate DC and AC drives

UNIT–I:
Controlled Converter Fed DC Motor Drives: Fundamentals of Electric Drives- Single-phase half and fully controlled converter fed separately excited and series DC motor drive – Output voltage and current waveforms – Speed-torque expressions – Speed-torque characteristics (Continuous conduction mode only). Four-quadrant operation-Principle of operation of dual converters and dual converter fed DC motor drives - Braking methods: Dynamic – Plugging – Regenerative methods. Numerical problems.

UNIT–II:
DC–DC Converters Fed DC Motor Drives: Single quadrant – Two quadrant and four quadrant DC-DC converter fed separately excited and self excited DC motors – Continuous current operation– Output voltage and current waveforms – Speed– torque expressions – Speed–torque characteristics –Four quadrant operation – Closed loop operation (qualitative treatment only).

UNIT–III:
Stator Side Control of 3-phase Induction Motor Drive : Stator voltage control using 3-phase AC voltage regulators – Waveforms –Speed torque characteristics– Variable Voltage Variable Frequency control of induction motor by PWM voltage source inverter – Closed loop v/f control of induction motor drives (qualitative treatment only).

UNIT–IV: Rotor Side Control of 3-phase Induction Motor Drive:
Static rotor resistance control – Slip power recovery schemes – Static Scherbius drive – Static Kramer drive – Performance and speed torque characteristics – Advantages –Applications.

UNIT–V:
Control of Synchronous Motor Drives: Separate control & self-control of synchronous motors – Operation of self-controlled synchronous motors by VSI– Closed Loop control operation of synchronous motor drives (qualitative treatment only). –Variable frequency control–Pulse width modulation.

Text Books:
1.Power Semiconductor Controlled Drives by G. K. Dubey Prentice Hall, 1989.
2. Electric Motor Drives: Modeling, Analysis and Control-by R. Krishnan Prentice Hall, 2001.

References:
1.Fundamentals of Electrical Drives by G. K. DubeyNarosa, 2002.
2.Modern Power Electronics and AC Drives byB. K. Bose, Prentice Hall,2001.
3.Control of Electric Drives by-W. Leonhard Springer Science & Business Media, 2001.

4. Power Semiconductor Drives byS. Sivanagaraju, M. Balasubba Reddy and A. MallikarjunaPrasad, Prentice Hall, 2009.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Analyze the operation of converter fed dc motors and four quadrant operations of dc motors using dual converters.

CO2: Describe the chopper fed dc motors in various quadrants of operation.

CO3: Know the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.

CO4: Differentiate the stator side control and rotor side control of three phase induction motor.

CO5: Explain the speed control mechanism of synchronous motors.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

B. TECH- VI SEM. (EEE) **L/T/P/C**
3/0/0 /3

Course Objective:

- To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business, operations cost analysis, markets, forms of business organizations, capital budgeting and financial accounting and financial analysis.

Unit I

Introduction & Demand Analysis.

Definition. Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants. Law of Demand and its exceptions. Elasticity of Demand: Definition. Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting. Factors governing demand forecasting. methods of demand forecasting.

Unit II

Production & Cost Analysis: Production Function

Isoquants and Is costs. MRTS. Least Cost Combination of Inputs. Cobb - Douglas Production function. Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts. Break - even Analysis (BEA) -Determination of Break - Even Point (simple problems) - Managerial Significance.

Unit III

Markets & New Economic Environment:

Types of competition and Markets. Features of Perfect competition, Monopoly and Monopolistic Competition. Price - Output Determination in case of Perfect Competition and Monopoly. Pricing Objectives and Policies of Pricing. Methods of Pricing. Eusness: Features and evaluation of different forms of Business Organization: Sole Proprietorship. Partnership. Joint Stock Company, Public Enterprises and their types. New Economic Environment Changing Business Environment in Post liberalization scenario.

Unit IV

Capital Budgeting:

Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements. Methods and sources of raising capital Trading Forecast. Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals. Methods of Capital Budgeting: Payback Method. Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis:

Accounting concepts and conventions - Introduction IFRS Ledger. Double - Entry Book Keeping, Journal, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance sheet with simple adjustments).

Financial, Analysis: Analysis and Interpretation of Liquidity Ratios. Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart

References:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand '2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis. New Age International Publishers, Hyderabad 2013
3. M' Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi. 2012.

4. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2012.

Course Outcomes:

CO1 Understand the nature, scope and importance of Managerial Economics.

CO2 Know what is demand, analyze demand and how elasticity of demand is used for pricing decisions and to evaluate methods for forecasting demand.

CO3 Know how production function is carried out to achieve least cost combination of Inputs and how to analyze cost.

CO4 Understand the characteristics of different kinds of markets and outline different form of business organization and analyze how capital budgeting techniques are used for investment decisions.

CO5 Know how to prepare final accounts and how to interpret them, analyze and interpret financial statements using ratio analysis.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ELECTRICAL DISTRIBUTION SYSTEMS
(PROFESSIONAL ELECTIVE-II)

B. TECH- VI SEM. (EEE) **L/T/P/C**
3/0/0 /3

Prerequisites:
Power Systems- I
Power Systems-II

Course Objectives:

- To distinguish between transmission and distribution systems
- To understand design considerations of feeders
- To compute voltage drop and power loss in feeders
- To understand protection of distribution systems
- To examine the power factor improvement and voltage control

UNIT – I:

General Concepts: Introduction to distribution systems, Load modelling and characteristics. Coincidence factor, contribution factor loss factor - Relationship between the load factor and loss factor. Classification of loads (Residential, commercial, Agricultural and Industrial) and their characteristics. Distribution Feeders Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, voltage levels, feeder loading; basic design practice of the secondary distribution system.

UNIT – II:

Substations: Location of Substations: Rating of distribution substation, service area within primary feeders. Benefits derived through optimal location of substations. Bus bar arrangements in Sub-Stations: single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams. System Analysis Voltage drop and power-loss calculations: Derivation for voltage drop and power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines.

UNIT – III:

Protection: Objectives of distribution system protection, types of common faults and procedure for fault calculations. Protective Devices: Principle of operation of Fuses, Circuit Reclosures, line sectionalizers, and circuit breakers Coordination: Coordination of Protective Devices, General coordination procedure.

UNIT – IV:

Compensation for Power Factor Improvement: Basics of Capacitive compensation for power-factor control. Different types of power capacitors, shunt and series Capacitors, effect of shunt capacitors (Fixed and switched), Power factor correction, capacitor allocation Economic justification - Procedure to determine the best capacitor location.

UNIT – V:

Voltage Control: Equipment for voltage control, effect of series capacitors, effect of AVB/AVR, line drop Compensation. Forward and backword power flow studies.

Text book:

1. Electric Power Distribution system, Engineering – by TuranGonen, Mc Graw-hill Book Company.

2. Electric Power Distribution – by A.S. Pabla, Tata Mc Graw-hill Publishing Company, 4th edition 2008.

References:
1. Electrical Power Distribution and Automation by S.Sivanagaraju, V.Sankar, Dhanpat Rai &Co, 2006
2. Electrical Power Distribution Systems by V.Kamaraju, Right Publishers.

Course Outcomes:
On successful completion of this course, students are able to:
CO1: Understand design of various loads
CO2: Analyze the need of substations and there erection and site selection
CO3: Understand protection of distribution system.
CO4: Acquire knowledge of power factor improvement.
CO5: Calculate the distribution voltage drop calculations.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ELECTRICAL ENGINEERING MATERIALS
(PROFESSIONAL ELECTIVE-II)

B. TECH- VI SEM. (EEE) **L/T/P/C**
3/0/0 /3

Prerequisites:
Physics

Course Objectives:

- To impart the knowledge on Electrical Engineering materials Classification and their applications
- To know the performance characteristics of various Semiconducting, Dielectric & Insulation Materials

UNIT-I:

Classification of Materials: Introduction, Atomic Theory, inter atomic Bonds Conducting Materials: Introduction, Resistivity and factors affecting resistivity, Classification of Conducting materials into low-resistivity and high resistivity materials, Low Resistivity Materials and their Applications, Resistivity Materials and their applications, Superconducting Materials.

UNIT-II:

Semiconducting Materials: Introduction, The Atom, Conductors and Insulators, Semiconductors, Electron Energy and Energy Band Theory, Excitation of atoms, Insulators, Semiconductors and Conductors, Semiconductor Materials, Covalent Bonds, Intrinsic Semiconductors-Type Materials, P Type Materials, Majority and Minority Carriers, Semiconductors Materials, Applications of Semiconductor Materials.

UNIT-III:

Dielectric Materials: Introduction, Dielectric constant of Permittivity, Polarization, Dielectric Losses, Electric Conductivity of Dielectrics and their Break Down, Properties of Dielectrics, Applications of Dielectrics.

UNIT-IV:

Insulating Materials: Introduction, General properties of insulating materials, Classification, Properties, Insulating Gasses. Magnetic Materials: Introduction, Classification, Magnetization curve, Hysteresis, Eddy Currents, Curie point, Magnetostriction, Soft and Hard Magnetic materials.

UNIT-V:

Materials for special purposes: Introduction, Structural materials, Protective materials, Other Materials.
Electronic Components: Resistors, Capacitors, Inductors, Transformers.

Text books:

1. Electrical Engineering Materials by S.K.Bhattacharya, S.K.Kataria& Sons 1st edition

References:

1. "Electrical Engineering Materials by A.J.Dekker,PHI, 1970.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Impart the knowledge on electrical engineering materials classification and their applications.
CO2: Study the performance characteristics of various semiconducting, dielectric and insulation materials and their applications in design of electrical and electronic devices.
CO3: Identify various magnetic materials and their classification.
CO4: Learn various special purpose of materials.
CO5: Design various electronic components.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DIGITAL SIGNAL PROCESSING
(PROFESSIONAL ELECTIVE-II)

B. TECH- VI SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-requisites: Signals and systems

Course Objectives:

- To provide background and fundamental material for the analysis and processing of digital signals.
- To study fundamentals of time, frequency and Z-plane analysis and to discuss the inter-relationships of these analytic method.
- To study the Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT) for signal analysis.
- To study the designs and structures of digital (IIR & FIR) filters from analysis to synthesis for agiven specifications.
- To introduce the architecture of DSP processors

Unit I

Theory of discrete time linear systems: Introduction, Classification of Signals and Systems, Discrete Time systems, Linearity, Time Invariance, Causality, Stability.

Z-transform: Z-transform and its properties, Inverse Z transforms, Difference equations, Transfer function of linear discrete systems, Impulse response.

Unit II

Discrete Fourier transform: Discrete Fourier Transform (DFT) definition, Properties of discrete Fourier transforms, Convolution of sequences - linear convolution.

FFT algorithms: Properties of Twiddle factor, Introduction to Radix 2 Fast Fourier transform (FFT), Decimation in time FFT and Decimation in frequency FFT Algorithms, Computing Inverse DFT using FFT.

Unit III

Theory and design of digital non recursive filters: Design characteristics of FIR filters with linear phase, Frequency response of linear phase FIR filters, FIR filters using window functions, **Realization of non recursive filters:** Direct form structure, Cascade form structures, FIR Linear Phase Realization.

Unit IV

Theory and design of digital recursive filters: Review of design techniques for analog low pass filter, frequency transformation, Properties of IIR filter, IIR filter design, Different methods of IIR filter design, **Realization of recursive filters**: Direct form structures, Signal flow graphs and transposed structures, cascade form structures, Parallel form structures.

Unit V General purpose digital signal processors

Introduction, Computer architectures for signal processing- Von Neumann architecture, Harvard architecture, Pipelining, Multiply accumulation unit, on chip memory/cache and Extended parallelism. General-purpose digital signal processors.

Text Books

1. J.G.Proakis , D.G. Manolakis and D. Sharma, Digital Signal Processing - Principles, Algorithms andApplications, Pearson Education, 2006
2. Simon Haykin & Barry van veen, Signals and Systems, 2nd edition, John Wiley publication, 2004/2005

Reference Books

1. Oppenhiem V.A. and Schaffer, Discrete - time Signal Processing, Prentice Hall of India,2005
2. Leudeman L.C, Fundamentals of Digital Signal Processing, Harper & Row Publication,2006
3. Emmanuel C.Ifeachor, Digital Signal Processing -A Practical Approach , Pearson Education, 2006
4. Andreas Antoniou, Digital Signal Processing, Tata McGraw-Hill,-2006

Course Outcomes:

On completion of this subject, the student should be able to:

CO1 Identify the different types of the discrete signals and systems.

CO2 Understand the inter relationship between DFT and various transforms and fast computation of DFTand appreciate the FFT processing

CO3 Understand the characteristics of FIR filters and classify the different types of windowing techniques.

CO4 Design a IIR digital filters for a given specifications and Apply the knowledge to real world processing applications.

CO5 Understand different types of signal processing architectures.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

Open Elective - I

B. TECH- VI SEM. (EEE) **L/T/P/C**
3/0/0 /3

Note: Students should take open electives from the list of open electives offered by the other departments/branches only.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

POWER ELECTRONICS LAB

B. TECH- VI SEM. (EEE) **L/T/P/C**
0/0/2 /1

Prerequisites:
Power Electronics

Course Objectives:

- To know the basic concept of powers semiconductor devices.
- To introduce working of all the types of converters.

List of Experiments

1. Study of Characteristics of SCR, MOSFET & IGBT.
2. Single Phase fully controlled bridge converter with R and RL loads.
3. Single Phase half-controlled converter with R and RL Loads.
4. Operation of Dual Converter with R and RL Load
5. Single Phase AC Voltage Controller with R and RL Loads.
6. Single Phase Cycloconverter with R and RL loads.
7. MOSFET based Stepdown Chopper.
8. MOSFET based Step-up Chopper.
9. Single-phase PWM Inverter with R and RL loads.
10. Single phase parallel inverter.

Course Outcomes:

On successful completion of this course, students are able to:
CO1: Study Characteristics of various Power Semiconductor devices.
CO2: Analyze AC/AC and AC/DC Converters.
CO3: Analyze the behavior of various DC/DC and DC/AC converters.
CO4: Understand types of Power Electronic converters and identify their applications.
CO5: Know the PWM techniques used for power converters

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
CONTROL SYSTEMS LAB

B. TECH- VI SEM. (EEE) **L/T/P/C**
0/0/2 /1

Prerequisites:
Control Systems

Course Objectives:
- To introduce the time domain specifications and analysis of various systems.
- To Design the various time domain controllers and frequency domain compensators
- To performance study of the systems with and without controllers and comparison.

List of Experiments:
1. Time response of Second order system
2. Characteristics of Synchros.
3. Programmable Logic Controller – Study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control of motor.
4. Effect of feedback on DC Servo Motor
5. Transfer function of DC Motor
6. Effect of P, PD, PI, PID Controller on a second order systems
7. Lag and Lead Compensation – Magnitude and Phase plot
8. Transfer function of DC Generator
9. Characteristics of Magnetic Amplifiers
10. Characteristics of AC Servo Motor

Course Outcomes:
On successful completion of this course, students are able to:
CO1: Analyze the time & Frequency response of control systems
CO2: Evaluate the performance of feedback control systems.
CO3: Examine the response of PID controllers.
CO4: Identify the Performance of AC & DC servo motors
CO5: Know the magnetic amplifier.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ELECTRONICS DESIGN LAB

B. TECH- VI SEM. (EEE) **L/T/P/C**
0/0/2 /1

Prerequisites:
Electrical Circuits
Power Electronics

Course Objectives:
- Design of linear regulated power supplies.
- Development of analog control boards for power converter applications.

List of Experiments:
1. Design of fixed unipolar linear regulated power supply.
2. Design of adjustable unipolar linear regulated power supply.
3. Design of fixed bipolar linear regulated power supply.
4. Design of Resistance-Capacitance triggering circuit for SCR.
5. Design of UJT triggering circuit for SCR.
6. Design of pulse generation for buck/boost converter by using 555 TIMER.
7. Design of voltage/current sensor scaling circuit for DSP applications.
8. Design of isolated driver circuit for MOSFET/IGBT triggering.
9. Generation of sinusoidal pulse width modulation with linear ICs.
10. Design of Zero crossing Detector.

Course Outcomes:
On successful completion of this course, students are able to:
CO1: Design the various regulated power supplies for control boards.
CO2: Gain knowledge on designing of various triggering circuits for SCR.
CO3: Develop scaling and conditioning circuits for various sensors.
CO4: Develop PWM control and gate driver circuits for various power electronic applications.
CO5: Develop the zero-crossing detector.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

PROJECT BASED LEARNING - 4

B. TECH- VI SEM. (EEE) **L/T/P/C**
0/0/2 /1

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

LOGICAL REASONING & QUANTATIVE APTITUDE

B. TECH- VI SEM. (EEE) **L/T/P/C**
0/0/2 /1

Pre-requisites: None
Course Objectives:

To learn

1. To improve logical thinking with general applications using mathematical concepts like sequences, series, number theory and probability.
2. It also features students to analyze data interpretation and able of improve their mathematical skills in various general aspects like coding and decoding, Time and Work puzzles solving blood relations etc.

Unit – I: Logical Reasoning

1. Coding and Decoding
2. Distance and Directions
3. Classifications
4. Odd man out and series
5. Clocks and Calendars etc.

Unit – II: Logical ability

1. Blood relations
2. Seating Arrangements
3. Figure Analysis
4. Puzzles etc.

Unit – III: Number systems

1. LCM and HCF
2. Ratio and proportion
3. Simple interest and compound interest
4. Profit and Loss etc.

Unit – IV: Arithmetic ability

1. Time and work
2. Partnerships
3. Time speed and distance
4. Problems on Trains etc.

Unit – V: Mathematical ability

1. Sequence and series
2. Permutations and combination
3. General probability etc.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1: Apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.

CO2: Apply quantitative correctly arrive at meaningful conclusions regarding their answers and manipulate equations and formulas in order to solve for the desired variable

CO3: Interpret given information correctly, determine which mathematical model best describes the data, and apply the model correctly.

CO4: Correctly apply mathematical language and notation to explain the reasoning underlying their conclusions when solving problems using mathematical or statistical techniques.

CO5: Improve their mathematical skills in various general aspects to solve real time problems.

Reference Books:

1. A modern approach to verbal and non-verbal reasoning by Dr. R.S. Aggarwal.
2. Quantitative Aptitude by AbhijitGuha Tata McGraw-Hill Company Limited.
3. Quantitative Aptitude by P.A. Anand (Wiley)
4. Quantitative Aptitude by Dr. R.S. Agarwal.
5. Objective Arithmetic by S.L. Gulati.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

POWER SYSTEM OPERATION AND CONTROL

B. TECH- VII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-Requisites:
Power system I & II
Power System II
Computer Methods in Power System

Course Objectives:

- It deals with economic operation of power system, computation of transmission line loss
- It deals with modelling of hydro thermal coordination problem, governor and turbine model, and load frequency control
- It deals with reactive power control and deregulation concept of power system.

UNIT-I:

Economic Operation of Power Systems: Optimal Operation of Generators in Thermal Power Stations, Heat Rate Curve, Cost Curve, Incremental Fuel and Production Costs, Input-Output Characteristics of Steam Unit, Optimum Generation Allocation with line losses neglected. Optimum Generation Allocation including the effect of Transmission Line Losses, Loss Coefficients Transmission Line Loss Formula – Numerical problems.

UNIT-II:

Hydrothermal Scheduling: Optimal Scheduling of Hydrothermal system, Hydroelectric Power Plant Models, types of Scheduling Problems, short term Hydrothermal Scheduling Problem. Numerical Problems.

UNIT-III:

Load Frequency Control: Modelling of Speed Governing System, Steam Turbine, Hydro Turbine and Generator. Necessity of keeping frequency constant, definitions of Control Area, Single Area Control Block diagram representation of an Isolated Power System, Steady State Analysis, Dynamic Response, Proportional Plus Integral Control of single area and its block diagram representation, Steady State Response. Load Frequency Control of 2- area system, Tie-Line Bias Control Comparison between Load Frequency Control and Economic Dispatch Control.

UNIT-IV:

Reactive Power Control: Overview of Reactive Power Control, Reactive Power Compensation in Transmission Systems, advantages and disadvantages of different types of Compensating Equipment for Transmission Systems, Load Compensation, specifications of Load Compensator, Uncompensated and Compensated Transmission Lines, Shunt and Series Compensation. Brief introduction to role of FACTS devices for Reactive power Control.

UNIT-V:

Power System Deregulation: Concept of load dispatch centre – system monitoring – data acquisition and control. -SCADA and EMS functions. Importance of Load Forecasting. Introduction to deregulation- motivation for restructuring of power systems- Electricity market entities model-benefits of deregulation- terminology-deregulation in Indian power sector Operations in power markets-power pools-transmission networks and electricity markets-Available Transfer Capability (ATC) concept.

Text books:

1. I J Nagrath & D P Kothari, "Modern Power system Analysis", Tata McGraw-Hill Publishing Company, 2nd Edition.
2. J. Wood & B.F. Woollenberg- John Wiley Power Generation, "Operation and Control"-2nd edition.

References:

1. Bhattacharya, Kankar, Bollen, Math, Daalder, Jaap E. "Operation of Restructured Power System", 2001, Springer.
2. B.R.Gupta, "Power System Analysis and design", S.CHAND publications
3. Power System Analysis by Hadi Saadat, TMH Publishers.

Course Outcomes:

On successful completion of this course, students are able to:
CO1: Analyse economic operation of power system.
CO2: Understand the working of hydrothermal coordination.
CO3: Analyse load frequency control of Single area and Two area power system.
CO4: Acquire knowledge on reactive power control
CO5: Understand the working of deregulated electricity markets

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
POWER SYSTEM PROTECTION

B. TECH- VII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Prerequisites:
Power system I
Power system II
Course Objectives:

UNIT-I:
Introduction to Circuit Breakers Circuit Breakers: Elementary principles of Arc Interruption, Arc Phenomena, Restriking Voltage and Recovery voltages. - Restriking Phenomenon, Average and Max. RRRV, Numerical Problems - Current Chopping and Resistance Switching - CB Ratings and Specifications: Types and Numerical Problems. – Auto Reclosures. Description and Operation of following types of circuit breakers: Minimum Oil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers.

UNIT-II:
Electromagnetic and Static Relays: Basic principle of electromagnetic Relay Operation, Types of Over Current Relays: Instantaneous, DMT and IDMT types. Application of relays: Over Current/ Under Voltage Relays, Direction Relays, Differential Relays and Percentage Differential Relays. Universal torque equation, Distance relays: Impedance, Reactance and Mho and Offset Mho relays, Characteristics of Distance Relays and Comparison. Static Relays: Static Relays verses Electromagnetic Relays. Introduction to Numerical Relays.

UNIT-III:
Protection of Generators and Transformers: Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Numerical Problems on % Winding Unprotected. Protection of transformers: Percentage Differential Protection, Numerical Problem on Design of CT s Ratio, Buchholz relay Protection.

UNIT-IV:
Protection of Transmission lines and bus bar Protection of Lines: Over Current, Carrier Current and Three-zone distance relay protection using Impedance relays. Translay Relay. Protection of Busbars – Differential protection

UNIT-V:
Neutral grounding and protection against over voltages: Grounded and Ungrounded Neutral Systems:- Effects of Ungrounded Neutral on system performance, Arcing Grounds Methods of Neutral Grounding: Solid, Resistance, Reactance – Peterson Coil, Generation of Over Voltages in Power Systems.-Protection against Lightning Over voltages – Valve type and Zinc-Oxide Lightning Arresters.

Text Books:
1. Paithankar and S.R.Bhide, Fundamentals of Power System Protection, PHI, 2003.
2. C R Mason, Art & Science of Protective Relaying – Wiley Eastern Ltd.

References:

1. B.L.Soni, Gupta, Bhatnagar, Chakrabarthy, A Text book on Power System Engineering, Dhanpat Rai & Co.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Understand the basic construction and principle of arc interruptions in Circuit Breaker and its types.

CO2: Understand the basic principle of electromagnetic Relay Operation and its various types to different applications.

CO3: Explore the various schemes of protecting generator and transformers.

CO4: Explore various relaying operation in protecting the transmission line and bus bar.

CO5: Learn the necessity of neutral grounding and protection against overvoltage.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

MICROPROCESSORS AND MICROCONTROLLERS

B. TECH – VI Semester **L/T/P/C**
3/0 /0 /3

Pre Requisites: Computer Organization

Course Objectives:

The course objectives are:

- Outline the history of computing devices.
- To develop an in-depth understanding of the architecture operation of 8086 microprocessors.
- To develop an in-depth understanding of the architecture operation of 8051 microprocessors.
- To understand machine language programming & interfacing techniques.

UNIT I

Architecture of Microprocessors: Introduction to Microprocessors & Microcontrollers and. Overview of 8085 microprocessor. Overview of 8086 microprocessor. Signals and pins of 8086 microprocessor. Physical memory organization, maximum mode & minimum mode with timing diagrams.

UNIT II

Assembly language of 8086: Machine language Instruction format, Addressing modes, Instruction set of 8086, Assembler Directives and Operators, Assembly software programs with algorithms

UNIT III

Interfacing with 8086: Interfacing with RAMs, ROMs Interfacing with peripheral ICs like 8255, 8279, etc. Interfacing with key boards, ADCs, and DACs serial data transfer schemes USART 8251 serial data communication, interrupt vector table, interrupt structure with 8259 etc.

UNIT IV

Introduction to microcontrollers: overview of 8051 microcontroller, architecture, Input ports, memory organization, addressing modes and instruction set of 8051, simple programs

UNIT V

8051 Real time control: programming timer interrupts, programming external hardware interrupts,programming the serial communication interrupt, programming 8051 timers and counters.

Text Books:

1. D. V. Hall, Microprocessors and interfacing, TMGH, 2nd Edition 2006
2. Kenneth. J. Ayala, The 8051 microcontroller, 3rd ed.,cengage learning.

Reference Books

1. Ramesh S.Gaonkar, "Microprocessor - Architecture, Programming and Applications with the 8085",Penram International publishing private limited, fifth edition.
2. Doughlas V Hall, "Digital Systems and Microprocessors", McGraw Hill. 3rd Edition 2003
3. A.K. Ray & K.M.Bhurchandi, "Advanced Microprocessors andperipherals-Architectures,Programming and Interfacing", TMH, 2002 reprint.
4. Mohamed Ali Mazidi, Janice Gillispie Mazidi, "The 8051 microcontroller and embedded systems",Pearson education, 2004.

Course Outcomes:

Upon completion of the course students should be able to

CO1: Illustrate the internal organization of popular 8086/8051microprocessors/microcontrollers. Contrast hardware and software interaction and integration.

CO2: Design microprocessors and microcontrollers based systems and develop microcontroller basedsystems for real time applications

CO3: Understand microcontroller 8051 and its programming.

CO4: Explain the Memory organization, classification and their applications and

CO5: Assess programming, interfacing etc of various devices with microprocessors and external world.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
HIGH VOLTAGE ENGINEERING
(PROFESSIONAL ELECTIVE-III)

B. TECH- VII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-Requisites:

Power Systems-II
Electrical Measurements and Instrumentation
Switchgear and protection

Course Objectives:

- Various types of over voltages in power system and protection schemes discussed.
- This subject deals with the detailed analysis of Breakdown occurring in gaseous, liquids and solid dielectrics.
- Information about generation and measurement of High voltage and current.
- In addition, High voltage testing methods and Insulation coordination are also discussed.

UNIT-I:

Over voltage in Electrical Power System: Causes of over voltage and its effects on power system- Lightning, switching surges and temporary over voltages, Corona and its effect – Bewely lattice diagram Protection against over voltages.

UNIT- II:

Dielectric Breakdown: Properties of Dielectric materials – Gaseous Breakdown in uniform and non- uniform fields Vacuum breakdown – Conduction and breakdown in pure and commercial liquids – Breakdown mechanism in solid and composite dielectric – Applications of insulating materials in electrical equipment

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UNIT – III:

Generation Of High Voltage And High Currents: Generation of High DC Voltages: Rectifier , voltage multiplier van de graaff generator Generation of impulse voltage: single and multistage marx circuit – Generation of High AC voltages: cascaded transformer resonant transformer and tesla coil- generation of switching surges- generation of impulse currents – Triggering and control of impulse generator.

UNIT–IV:

Measurement of High Voltage and High Currents: High Resistance with series ammeter – Divider, Resistance, capacitance and mixed divider – Peak voltmeter and Generating voltmeter – Capacitance Voltage Transformer, Electrostatic Voltmeters – Sphere Gaps – High current shunts.

UNIT – V:

High Voltage Testing and Insulation Coordination: Testing of Insulators and bushings, Testing of Isolators and circuit breakers, testing of cables, Testing of Transformers, Testing of Surge Arresters, and Insulation coordination.

Text books:

1. M.S.Naidu and V. Kamaraju , High Voltage Engineering by– TMH Publications, 3rd Edition
2. E.Kuffel, W.S.Zaengl, J.Kuffel, High Voltage Engineering: Fundamentals by Elsevier, 2nd Edition.

Reference books:

1. C.L.Wadhwa , High Voltage Engineering by, New Age Internationals (P) Limited, 1997.
2. Ravindra Arora, Wolfgang Mosch, High Voltage Insulation Engineering by, New Age International (P) Limited, 1995.
3. Mazen Abdel Salam, Hussein Anis, Ahdan El-Morshedy, Roshdy Radwan, Marcel Dekker High Voltage Engineering, Theory and Practice.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Understand Transients in power system.

CO2: Acquire the knowledge on breakdown in solid, Liquid and gaseous dielectrics.

CO3: Understand the generation of high voltage and current.

CO4: Identify the measurement of high voltage and current.

CO5: Analyze power apparatus and insulation coordination.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ADVANCED POWER ELECTRONICS
(PROFESSIONAL ELECTIVE-III)

B. TECH- VII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Prerequisites:
Power Electronics

Course Objectives:

- To introduce advanced power semiconductor switching devices.
- To study the resonant converters and multilevel converters.

UNIT-I:

Gate Driver circuits for power semiconductor devices: IGBT, MOSFET, IGCT, GTO and their driver circuits

UNIT-II:

Multi-Pulse Converters: Three-phase converters, effect of load and source impedances; Dual converter, multi-pulse converters, transformer utilization; Multi-pulse converters using delta/ zigzag/ Polygon transformers, analysis.

UNIT-III:

Resonant Converters: Need of resonant converters, Classification of resonant converters, load resonant converters, Resonant switch converters, zero voltage switching dc-dc converters, zero current switching dc-dc converters.

UNIT-IV:

DC-AC Converters: Review of three-phase voltage source inverters, voltage and frequency control. Harmonic reduction techniques, PWM inverters, Space Vector Modulation. Current source inverters.

UNIT-V:

Multilevel Inverters: Multi-level inverters, advantages, configurations: Diode clamped, flying capacitor and cascade multilevel inverters, applications.

Text Books:

1. M. H. Rashid, "Power electronics: circuits, devices, and applications", Pearson Education India,2009.
2. N. Mohan and T. M. Undeland, "Power Electronics: Converters, Applications and Design",John Wiley & Sons, 2007.

References:

1. R. W. Erickson and D. Maksimovic, "Fundamentals of Power Electronics", Springer Science & Business Media, 2007
2. Daniel W. Hart "Power Electronics", Tata McGraw-Hill Education, 2011.
3. Bin Wu "High-Power Converters and AC Drives", Wiley IEEE-Press,2005
4. L. Umanand, "Power Electronics: Essentials and Applications", Wiley India, 2009.
5. M.D. Singh & K.B. Kanchandhani "Power Electronics", Tata Mc Graw Hill, 2017.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Classify driver circuits for various power semiconductor devices.
CO2: Analyze the operation of multi-pulse converters.
CO3: Understand the operation of resonant converters.
CO4: Know the differences between VSI and CSI.
CO5: Gain knowledge on the operation of multilevel inverters.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ADVANCED CONTROL SYSTEMS
(PROFESSIONAL ELECTIVE-III)

B. TECH- VII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-Requisites:
Electrical Circuits-I
Electrical Circuits- II
Control Systems

Course Objectives:

- This course is gives a knowledge of various function analysis phase-plane analysis Stability Analysis.
- Provides knowledge on formulating optimal control problem

UNIT – I:
Describing Function Analysis: Introduction to nonlinear systems, Types of nonlinearities, describing functions, describing function analysis of nonlinear control systems.

UNIT-II:
Phase-Plane Analysis: Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase-plane analysis of nonlinear control systems.

UNIT-III:
Stability Analysis: Stability in the sense of Lyapunov, Lyapunov's stability and Lyapunov's instability theorems. Direct method of Lyapunov for the Linear and Nonlinear continuous time autonomous systems.

UNIT – IV:
Modal Control: Effect of state feedback on controllability and observability, Design of State Feedback Control through Pole placement. Full order observer and reduced order observer. Calculus of Variations Minimization of functionals of single function, constrained minimization. Minimum principle. Control variable inequality constraints. Control and state variable inequality constraints. Euler Lagrangine Equation.

UNIT –V:
Optimal Control: Formulation of optimal control problem. Minimum time, Minimum energy, minimum fuel problems. State regulator problem. Output regulator problem. Tracking problem, Continuous-Time Linear Regulators.

Text books:
1. Modern Control System Theory – by M. Gopal, New Age International Publishers, 2nd edition, 1996
2. Modern Control Engineering – by K. Ogata, Prentice Hall of India, 3rd edition, 1998

References:
1. Control Systems Engineering by I.J. Nagarath and M.Gopal, New Age International (P) Ltd.
2. Digital Control and State Variable Methods – by M. Gopal, Tata Mc Graw-Hill Companies, 1997.
3. Systems and Control by Stainslaw H. Zak, Oxford Press, 2003.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Understand different non linearities and their describing functions.

CO2: Describe the methods of Phase-plane trajectory of nonlinear control systems.

CO3: Apply various theorems for stability analysis of linear and nonlinear systems.

CO4: Implement modal control and calculus of variations.

CO5: Formulate and solve optimal control problems.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ELECTRICAL MACHINE DESIGN
(PROFESSIONAL ELECTIVE-III)

B. TECH- VII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-Requisites:
Electrical Machines-I
Electrical Machines-II
Electrical Machines-III

Course Objectives:
- To impart knowledge on principles and design of static and rotating electrical machines.
- To give a basic idea about computer aided design (CAD) and finite element method

UNIT-I:
Basic Considerations: Basic concept of design, Limitation in design, Standardization, modern trends in design and Manufacturing techniques, Classification of insulating materials. Modes of heat dissipation & temperature rise time curves. Methods of cooling ventilation (induced & forced, Radial & axial), Direct cooling & quantity of cooling medium. Calculation of total mmf and magnetizing current. Specific permeance and leakage reactance.

UNIT-II:
Design of DC Machines: Output equation, choice of specific loading and choice of number of poles, Design of Main dimensions of DC machines, Design of armature slot dimensions, Commutator and brushes, Magnetic circuit – estimation of ampere turns, Design of yoke and poles- main and inter poles, Field windings shunt, Series and inter poles.

UNIT-III:
Design of Transformers (Single Phase): Output equation for single phase, Choice of specific loadings, Expression for volts/turn, determination of main dimensions of the core, types of windings and estimation of number of number of turns and conductor cross sectional area of primary and secondary windings, estimation of no load current, Expression for leakage reactance and voltage regulation. **Design of Transformers (Three Phase):** Output equation for three phase transformers, Choice of specific loadings, expression for volts/turn, Determination of main dimensions of the core, Types of windings and estimation of number turns and conductor cross sectional area of primary and secondary windings, Estimation of no load current, expression for leakage reactance and voltage regulation. Design of tank and cooling tubes (round and rectangular).

UNIT-IV:
Design of Induction Motors: Output equation, choice of specific loadings, Main dimensions of three phase induction motor, Stator winding design, Choice of length of the air gap, estimation of number of slots for the squirrel cage rotor, Design of Rotor bars and end ring, Design of Slip ring induction motor, Estimation of No load current and leakage reactance, and Circle diagram.

UNIT-V:
Design of Synchronous Machines: Output equation, Choice of specific loadings, Short circuit ratio, Design of main dimensions, Armature slots and windings, Slot details for the stator of salient and non- salient pole synchronous machines. Design of rotor of salient pole synchronous Magnetic circuits, Dimensions of the pole body, Design of the field winding, and Design of rotor of non- salient pole machine, Introduction to computer aided design.

Text Books:

1. A K Sawhney, "A Course in Electrical Machine Design", Dhanpat rai *and* sons, Delhi.
2. Generalized theory of electrical machines-Dr.P.S.Bhimbhra

References:

1. M. V. Deshpande, " Design and Testing of Electrical Machines", Wheeler Publishing.
2. R. K. Agarwal, " Principles of Electrical Machine Design", Essakay Publications, Delhi.
3.Ramamoorthy M, "Computer Aided Design of Electrical Equipment", East-West Press.
4. M. N. O. Sadiku, " Numerical techniques in Electromagnetics", CRC Press Edition-2001

Course Outcome:

On successful completion of this course, students are able to:

CO1: Understand the basic design consideration, standards. Study the heat dissipation, cooling characteristics and electrical characteristics of various dielectric materials.
CO2: Understand the design, choice of materials and specifications in DC machines
CO3: Understand and design the main dimensions of each part of a transformers
CO4: Design the constructional features of induction motors and estimate their currents and reactance
CO5: Design the constructional features of synchronous motors

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ADVANCED ELECTRICAL DRIVES
(PROFESSIONAL ELECTIVE-IV)

B. TECH- VII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Prerequisite:
Electrical Machines-I, II & III
Power Electronics

Course Objectives:

- To introduce three phase converter fed DC motor drives.
- To provide knowledge on scalar and vector control of induction motor, PMSM and BLDC drives.

UNIT-I:

Three Phase Converter Fed DC Motor Drives: Three-phase half and fully controlled converter fed separately excited and series DC motor drive – Output voltage and current waveforms – Speed-torque expressions – Speed-torque characteristics (Continuous conduction mode only).

UNIT-II:

VSI and CSI Fed Induction Motor Control: AC voltage controller fed induction machine operation – Energy conservation issues – V/f operation theory – requirement for slip and stator voltage compensation. CSI fed induction machine – Operation and characteristics - PWM controls.

UNIT-III:

Vector Control of Induction Motor drives: Field oriented control of induction machines – Theory – DC drive analogy – Direct or Feedback vector control - Indirect or Feed forward vector control – Flux vector estimation - Space Vector Modulation control.

UNIT-IV:

Direct Torque Control of Induction Motor drives: Direct torque control of Induction Machines – Torque expression with stator and rotor fluxes, DTC control strategy – optimum switching vector selection – reduction of torque ripple methods.

UNIT-V:

Vector control of PMSM drives: Types of PM Synchronous motors - Torque developed by PMSM - Implementation of vector control for PMSM – introduction to BLDC drives

Text Books:

1. G. K. Dubey, "Power Semiconductor Controlled Drives", Prentice Hall, 1989.
2. R. Krishnan, "Electric Motor Drives: Modeling, Analysis and Control", Prentice Hall, 2001.

References:

1. Vedam Subramanyam, "Electric Drives – Concepts and Applications", Tata McGraw Hill, 2000.
2. W. Leonhard, "Control of Electric Drives", Springer Science & Business Media, 2001.
3. Austin Hughes, "Electric Motors and Drives – Fundamentals, Types and Applications", Elsevier, 2006.
4. B. K. Bose, "Modern Power Electronics and AC Drives", Prentice Hall,2001.

Course Outcomes:

On successful completion of this course, students are able to:

CO1 Analyse the operation of three phase converter fed dc motors.
CO2 Describe the VSI and CSI fed induction motor operation.
CO3 Know the concept of vector control of induction motor drive.
CO4 Understand the concept of direct torque control for three phase induction motor.
CO5 Gain knowledge on vector control of PMSM drives and introduction to BLDC drives.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
AI TECHNIQUES IN ELECTRICAL ENGINEERING
(PROFESSIONAL ELECTIVE-IV)

B. TECH- VII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-Requisites:
Nill

Course Objectives:

- Its deals with various Artificial Intelligent techniques like neural networks, fuzzy logic and genetic algorithms useful to solve electrical engineering problems.

UNIT-I:

Artificial Neural Networks: Introduction-Models of Neural Network - Architectures – Knowledge representation – Artificial Intelligence and Neural networks–Learning process – Error correction learning – Hebbian learning –Competitive learning –Boltzman learning –Supervised learning – Unsupervised learning – Reinforcement learning.

UNIT-II:

ANN Paradigms: Multi – layer perceptron using Back propagation Algorithm-Self – organizing Map – Radial Basis Function Network – Functional link, network – Hopfield Network.

UNIT-III:

Fuzzy Logic: Introduction – Fuzzy versus crisp – Fuzzy sets - Membership function – Basic Fuzzy set operations – Properties of Fuzzy sets – Fuzzy cartesian Product –Operations on Fuzzy relations– Fuzzy logic - Fuzzy Inference-Fuzzy Rule based system-Defuzzification methods.

UNIT-IV:

Genetic Algorithms: Introduction-Encoding –Fitness Function-Reproduction operators-Genetic Modelling –Genetic operators-Crossover-Single – site crossover-Two point crossover –Multi point crossover Uniform crossover -Crossover Rate-Inversion & Deletion –Mutation operator – Mutation Rate-Bit-wise operators -convergence of Genetic Algorithm.

UNIT-V:

Applications of AI Techniques: Load flow studies – Economic load dispatch –Load frequency control – Single area system and two area system and Study of neural network toolbox and fuzzy logic toolbox and GA tool box in Matlab Simulink.

Text books

1. Neural Networks, Fuzzy Logis and Genetic Algorithms: Synthesis, and Applications, S. Rajasekaran, and G. A. Vijayalakshmi Pai, Prentice Hall of India, 2007.
2. Fuzzy Logic with Engineering Applications (3rd Edn.), Timothy J. Ross, Willey, 2010.

References

1. Foundations of Neural Networks, Fuzzy Systems, and Knowldge Engineering, Nikola K. Kasabov, MIT Press, 1998.
2. Fuzzy Logic for Embedded Systems Applications, Ahmed M. Ibrahim, Elesvier Press, 2004.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Identify and describe AI techniques and their roles in building intelligent machines.

CO2: Understand the working of multilayer neural networks.

CO3: Explore fuzzy logic and reasoning.

CO4: Learn genetic algorithms to optimization problems.

CO5: Evaluate and compare solutions by AI approaches for a given problem in matlab simulink.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
UTILIZATION OF ELECTRICAL ENERGY
(PROFESSIONAL ELECTIVE-IV)

B. TECH- VII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-Requisites:
Applied Physics
Electrical Machines-I
Electrical Machines-II

Course Objective:

- This subject deals with the fundamentals of illumination and its classification and the electric heating and welding.
- It gives the detailed study of all varieties of Electric drives and their application to electrical traction systems.

UNIT-I:
Electric Drives: Type of electric drives, choice of motor, starting and running characteristics, speed control, temperature rise, particular applications of electric drives, types of industrial loads, continuous, intermittent and variable loads, load equalization.

UNIT-II:
Electric Heating: Advantages and methods of electric heating, resistance heating induction heating and dielectric heating. Electric Welding Electric welding, resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

UNIT-III:
Illumination: Introduction, terms used in illumination, laws of illumination, polar curves, photometry, Integrating sphere, sources of light. Various Illumination Methods. Discharge lamps, MV and SV lamps comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting.

UNIT-IV:
Electric Traction-I: System of electric traction and track electrification. Review of existing electric traction Systems in India. Special features of traction motor, methods of electric braking-plugging rheostat braking and regenerative braking. Mechanics of train movement. Speed-time curves for different services – trapezoidal and Quadrilateral speed time curves.

UNIT-V:
Electric Traction-II: Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and coefficient of adhesion.

Text Books:
1. E. Openshaw Taylor, Utilisation of Electric Energy – by University press.
2. Partab, Art & Science of Utilization of electrical Energy –Dhanpat Rai & Sons.

Reference Books:

1. N.V.Suryanarayana, Utilization of Electrical Power including Electric drives and Electric traction, New Age International (P) Limited, Publishers, 1996.

2. C.L. Wadhwa, Generation, Distribution and Utilization of electrical Energy, New Age International (P) Limited, Publishers, 1997.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Choose a right drive for a particular application.

CO2: Identify Heating and welding schemes for given application.

CO3: Explain the basics of lighting and methods of illumination and its parameters

CO4: Understand the different schemes of traction systems, its characteristics and its main components.

CO5: Analyze electrical energy consumption for traction system.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
HIGH VOLTAGE DC TRANSMISSION
(PROFESSIONAL ELECTIVE-IV)

B. TECH- VII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-Requisites:
Electrical Circuits-II
Power Electronics
Power Systems-I
Power Systems-II

Course Objectives:

- To impart the students with different technologies available for High Voltage Power System
- Different control strategies for efficient operation of the power system under normal and abnormal conditions.

UNIT – I:

Basic Concepts: Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links – Apparatus required for HVDC Systems – Comparison of AC & DC Transmission, Application of DC Transmission System – Planning & Modern trends in D.C. Transmission. Brief discussion on role of HVDC Technology in Indian Power Sector.

UNIT – II:

Analysis of HVDC Converters: Choice of Converter configuration – analysis of Graetz – characteristics of 6 Pulse & 12 Pulse converters – Cases of two 3 phase converters in star – star mode– their performance. Converter & HVDC system control: Principle of DC Link Control – Converters Control Characteristics – Firing angle control – Current and extinction angle control – Effect of source inductance on the system; Starting and stopping of DC link; Power Control.

UNIT – III:

Reactive Power Control in HVDC: Reactive Power Requirements in steady state-Conventional control strategies-Alternate control strategies-sources of reactive power-AC Filters – shunt capacitors- synchronous condensers. Power Flow Analysis in AC/DC Systems Modeling of DC Links - DC Network - DC Converter - Controller Equations - Solution of DC load flow – P.U. System for D.C quantities - solution of AC - DC Power flow-Simultaneous method - Sequential method.

UNIT-IV:

Converter Fault & Protection: Converter faults – protection against over current and over voltage in converter station – surge arresters – smoothing reactors – DC breakers –Audible noise-space charge field-corona effects on DC lines-Radio interference.

UNIT – V:

Harmonics : Generation of Harmonics –Characteristics harmonics, calculation of AC Harmonics, Non Characteristics harmonics, adverse effects of harmonics – Calculation of voltage & Current harmonics
– Effect of Pulse number on harmonics
Filters: Types of AC filters, Design of Single tuned filters –Design of High pass filters.

Text books:

1. K.R. Padiyar –"HVDC Power Transmission Systems: Technology and system Interactions" – New Age International (P) Limited, and Publishers.
2. S.S.Rao—"EHVAC and HVDC Transmission Engineering and Practice"
3. Prabha Kundur- "Power System Stability and Control" TMH edition-2004

References:

1. E.W.Kimbark –"HVDC Transmission –Direct Current Transmission "– John Wiley & Sons.
2. E.Uhlmann –"Power Transmission by Direct Current" – B.S.Publications.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Know the basic concepts of HVDC transmission.
CO2: Understand the complete operation of HVDC Converter stations.
CO3: Understand the power flow control on HVDC Transmission system.
CO4: Understand the Operation of the controller for HVDC in worst and normal operations.
CO5: Design the Various filters.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
MICROPROCESSORS & MICROCONTROLLERS LAB

B. TECH – VI Semester **L/T/P/C**
0/0 /2 /1

Pre Requisites: None

Course Objectives:

- Outline the history of computing devices.
- To develop an in-depth understanding of the architecture operation of 8086 microprocessors.
- To develop an in-depth understanding of the architecture operation of 8051 microprocessors.
- To understand machine language programming & interfacing techniques.

Note: Minimum of 12 experiments are to be conducted.
The following programs/experiments are to be written for assembler and to be executed the same with 8086 and 8051 kits.

List of Experiments:

1. Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes).
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/ Counter in 8051.
12. Program and verify Interrupt handling in 8051
13. UART Operation in 8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/ Keyboard to 8051.
17. Data Transfer from Peripheral to Memory through DMA controller 8237 / 8257.

Course Outcomes

Upon completion of this Lab students should be able to

CO1: Demonstrate experimentally basic programming of Microprocessor.
CO2: Recall the microprocessor interfacing with various peripherals for various applications.
CO3: Apply the basic programming of microcontroller.
CO4: Examine microprocessor interfacing with various peripherals for various applications.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
POWER SYSTEMS LAB

B. TECH- VII SEM. (EEE) **L/T/P/C**
0/0/2 /1

Pre-Requisites:
Electrical Circuits-II
Power System-I
Power System-II

Course Objectives:

- Performance of Transmission Line.
- Operation and Performance of Over/Under Voltage and Over Current relays.
- Calculation of Sequence Impedances of 3-Φ Transformer.
- Operation of Electromagnetic type IDMT Over Current Relay.
- Fault analysis of Feeder and Alternator.

List of Experiments:

1. Performance and testing of Transmission Line Model.
2. Characteristics of Under Voltage Relay.
3. Characteristics of Over Voltage Relay.
4. Characteristics of IDMT Over Current Relay.
5. Performance and testing of Feeder protection system
6. Characteristics of Static Negative Sequence Relay.
7. Fault analysis of an Alternator- Line to Ground Fault.
8. Fault analysis of an Alternator- Line to Line Fault.
9. Determination of Sequence Impedances of 3-Φ Transformer.
10. Differential Protection of 1-Φ Transformer.

Course Outcomes:

On successful completion of this course, students are able to:
CO1. Calculate Transmission line parameters, efficiency and regulation.
CO2. Evaluate the Performance analysis of Over/Under Voltage Relay.
CO3. Understand the Analysis and performance testing of Feeder Protection System.
CO4. Calculate Sequence Reactance of 3-Φ Transformer.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

MINI PROJECT AND INTERNSHIP

B. TECH- VII SEM. (EEE) **L/T/P/C**
0/0/0/2

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

MAJOR PROJECT PHASE-1

B. TECH- VII SEM. (EEE) **L/T/P/C**

0/0/8/4

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
SOFT COMPUTING TECHNIQUES
(PROFESSIONAL ELECTIVE-V)

B. TECH- VIII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Prerequisites:
AI Techniques in Electrical Engineering

Course Objectives:

- Its deals with various soft computing techniques, importance of optimization techniques and multi-objective optimization
- It deals with hybrid soft computing techniques like Neuro-Fuzzy technique.

UNIT-I:

Introduction of SOFT computing: Concept of computing systems, " Soft" computing versus "Hard" computing, Characteristics of Soft computing, some applications of Soft computing techniques.

UNIT II:

Introduction to optimization algorithms: Applications for optimisation algorithms- local and global optimisation - methods based on derivatives - direct search methods – Particle Swarm optimization technique.

UNIT III:

Multi-objective optimization problem solving : Concept of multi-objective optimization problems (MOOPs) and issues of solving them, Multi-Objective Evolutionary Algorithm (MOEA), Non-Pareto approaches to solve MOOPs, Pareto based approaches to solve MOOPs, Some applications with MOEAs

UNIT-IV:

Neuro-Fuzzy Modelling: Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

UNIT-V:

Applications of soft computing techniques: Load forecasting using Neuro-Fuzzy – Economic load dispatch using PSO and Study of Neuro-Fuzzy Inference tool box and optimization toolbox in Matlab Simulink.

Text books:

1. Fletcher, R, "Practical Methods of Optimization" John Wiley & Sons, Incorporated, 2000.
2. S.N.Sivanandam And S.N.Deepa, "Principles Of Soft Computing", Wiley India Pvt Ltd, 2011.

References:

1. Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence by Jyh-Shing Roger Jang Pearson.
2. Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications, S. Rajasekaran, G. A. Vijayalakshami, PHI.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: To know basic idea of modern engineering techniques which are useful for solving non-linear and complex functions that may come across dissertation/research work
CO2: To understand optimization problem
CO3: Understand the concept of multi-objective optimization problems (MOOPs) and issues of solving it.
CO4: Knowing Adaptive Neuro-Fuzzy Inference Systems
CO5: Evaluate and compare solutions by soft computing techniques for a given problem in matlab Simulink

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
DIGITAL CONTROL SYSTEMS
(PROFESSIONAL ELECTIVE-V)

B. TECH- VIII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Pre-Requisites:
Control Systems

Course Objectives:

- To equip the students with the basic knowledge of A/D and D/A conversion
- To understand the basics of Z- Transform
- To study the stability analysis of digital control system
- Analyze digital control systems using state-space methods.
- Analyze digital control systems using transform techniques (frequency response) and state-space methods (pole-assignment).

UNIT I:

Introduction to Digital Control Systems And Z-Transforms Introduction - Merits and Demerits of Digital Control Systems - Practical aspects of the choice of sampling rate and Multirate sampling - Basic discrete time signals - Quantization – Sampling Theorem - Data Conversions and Quantization - Sampling process - Mathematical Modeling - Data Reconstruction and Filtering of sampled signals – Zero - Order Hold (ZOH). z- Transform and Inverse z-Transform, Relationship between s - plane and z - plane - Difference equation - Solution by recursion and z-Transform - Pulse Transfer Functions of the ZOH and relationship between G(s) and G(z)– Bilinear Transformation.

UNIT II:

Input/output Analysis of Digital Control Systems: Pulse transfer function - z transform analysis of open loop, closed loop systems - Modified z Transform - transfer function - Stability of linear digital control systems - Stability tests – Jury Stability test. Root loci - Frequency domain analysis - Bode plots

- Gain margin and phase margin.

UNIT III:

Design of Controllers For I/O Model Digital Control Systems Cascade and Feedback Compensation by continuous data controllers - Digital controllers - Design using Bilinear Transformation - Realization of Digital PID controllers, Design of Digital Control Systems based on Root Locus Technique.

UNIT IV:

State Space Analysis and State Feedback Control Design of Digital Control Systems State Equations of discrete data systems, solution of discrete state equations, State Transition Matrix: Computation methods for State Transition Matrix: z - transform method. Relation between State Equations and Pulse Transfer Functions. Concepts on Controllability and Observability - Pole placement design by state feedback.

UNIT V:

Digital State Observer and Stability Analysis Design of the full order and reduced order state observer, Design of Dead-beat Controller - some case studies - Stability analysis of discrete time systems based on Lyapunov approach.

Text books:

1. K. Ogata, Discrete Time Control Systems, PHI/Addison - Wesley Longman Pvt. Ltd., 1995.
2. B.C Kuo, Digital Control Systems, 2nd Edition, Oxford Univ Press, Inc., 1992.

References:

1. F. Franklin, J.D. Powell, and M.L. Workman, Digital control of Dynamic Systems, Addison Wesley Longman, Inc., Menlo Park, CA, 1998.
2. M. Gopal, Digital Control and State Variable Methods, Tata McGraw Hill, India, 1997.
3. C. H. Houpis and G.B. Lamont, Digital Control Systems, McGraw Hill, 1985.
4. John S. Baey, Fundamentals of Linear State Space Systems, Mc. Graw – Hill, 1st edition.
5. Bernard Fried Land, Control System Design, Mc. Graw – Hill, 1st edition.
6. Dorsay, Continuous and Discrete Control Systems, McGraw - Hill.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Acquire a strong foundation in sampling and reconstruction Z-transforms.
CO2: Apply knowledge of Mathematics, Z-plane analysis to discrete time control systems.
CO3: Replace the conventional control system with Digital control system.
CO4: Evaluate and apply Z-plane analysis of discrete time control systems
CO5: Apply state feedback controllers and observers

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
FLEXIBLE AC TRANSMISSION SYSTEMS
(PROFESSIONAL ELECTIVE-V)

B. TECH- VIII SEM. (EEE) **L/T/P/C**
3/0/0 /3

Prerequisites:
Power Electronics

Course Objectives:

- To know the concepts and types of FACTS controllers.
- To learn above types of converters.
- To study the various compensation techniques.

UNIT-I:
Facts Concepts Transmission: interconnections power flow in an AC system, loading capability limits, dynamic stability considerations, importance of controllable parameters basic types of FACTS controllers, benefits from FACTS controllers.

UNIT-II:
Voltage Source Converters: Single phase three phase full wave bridge converters transformer connections for 12 pulse 24 and 48 pulse operation. Three level voltage source converter, pulse width modulation converter, basic concept of current source Converters, and comparison of current source converters with voltage source converters.

UNIT-III:
Static Shunt Compensation: Objectives of shunt compensation, mid-point voltage regulation voltage instability prevention, improvement of transient stability, Power oscillation damping, Methods of controllable VAR generation, variable impedance type static VAR generators switching converter type VAR generators hybrid VAR generators.

UNIT-IV:
SVC and STATCOM: The regulation and slope transfer function and dynamic performance, transient Stability enhancement and power oscillation damping operating point control and summary of compensator control.

UNIT-V:
Static Series Compensators: Concept of series capacitive compensation, improvement of transient stability, power oscillation damping, and functional requirements of GTO thyristor controlled series capacitor (GSC), thyristor switched series capacitor (TSSC), and thyristor controlled series capacitor (TCSC) Control schemes for GSC TSSC and TCSC.

Text books:
1. “Understanding FACTS Devices” N.G. Hingorani and L. Guygi. IEEE Press Publications 2000
2. “Flexible AC Transmission Systems” Sang, Y.H. and John, A.T., IEEE Press 2006.

References:
1. “Thyristor Based FACTS Controllers for Electrical Transmission Systems”, Mathur, R.M. and Verma, R.K., IEEE Press 2002.

Course Outcomes:

On successful completion of this course, students are able to:
CO1: Know the concept of flexible AC transmission systems.
CO2: Understand the voltage source converters used in FACTS. **CO3:** Get the exposure on static shunt compensation.
CO4: Understand the SVC and STATCOM.
CO5: Get the exposure on static series compensation.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
VLSI DESIGN
(PROFESSIONAL ELECTIVE-V)

B. TECH – VI Semester **L/T/P/C**
3/0 /0 /3

Pre Requisites: Basic Electronic Devices, Electronic circuit analysis, Switching theory and Logic Design & Linear & Digital IC Applications

Course Objectives

- To brief about HDL in terms of Verilog and circuit design using different styles.
- Give exposure to different steps involved in the fabrication of ICs using MOS transistor, CMOS/BICMOS transistors and passive components. Explain electrical properties of MOS and BICMOS devices to analyze the behavior of inverters designed with various loads.
- Give exposure to the design rules to be followed to draw the layout of any logic circuit.
- Provide concept to design different types of subsystems that includes data path subsystem, array subsystem etc
- Understand basic programmable logic devices and testing of CMOS circuits.

UNIT I:

Introduction to Verilog HDL: VLSI Design Flow, Verilog as HDL, Levels of Design Description, Program structure, Language Constructs and Conventions, Different modeling methods and their language constructs with examples.

UNIT II:

Introduction: Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS

Basic Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits: I_{ds}-V_{ds} relationships, MOS transistor threshold Voltage, g_m, g_{ds}, Figure of merit ω_o; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT III:

VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2 μm CMOS Design rules.

Gate Level Design: Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits.

UNIT IV:

Data Path Subsystems: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters.

Array Subsystems: SRAM, DRAM, ROM, Serial Access Memories.

UNIT V:

Programmable Logic Devices: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach, Parameters influencing low power design.

CMOS Testing: CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques.

Text Books:

1. 1. T.R. Padmanabhan, B Bala Tripura Sundari, Design through Verilog HDL, Wiley 2009.
2. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell,PHI, 2005 Edition
3. CMOS VLSI Design – A Circuits and Systems Perspective, Neil H. E Weste, David Harris, Ayan Banerjee, 3rd Ed, Pearson, 2009.

4. VLSI Design – M. Michael Vai, 2001, CRC Press.

Reference Books

1. Zainalabdien Navabi, Verliog Digital System Design,TMH, 2nd Edition.
2. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press,2011
3. CMOS logic circuit Design - John .P. Uyemura, Springer, 2007.
4. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
5. VLSI Design- K .Lal Kishore, V. S. V. Prabhakar, I.K International, 2009.
6. Introduction to VLSI – Mead & Convey, BS Publications, 2010.

Course Outcomes

Upon completion of the course students should be able to

CO1: Design digital applications using Verilog HDL

CO2: Understand IC technology and basic electrical properties of MOS and BiCMOS.

CO3: Design the layout of circuits using various design rules. Develop and design the gate level circuits

CO4: Gain the knowledge to design data path subsystems like Adders, Shifters, and ALUs etc.

CO5: Illustrate different programmable logic devices and CMOS testing.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
POWER QUALITY
(PROFESSIONAL ELECTIVE-VI)

B. TECH- VIII SEM. (EEE) **L/T/P/C**
3/0/0/3

Pre-Requisites:
Power Systems-I &
II Power
Electronics **Course**

Objectives:

- To study, understand and analyze various power quality issues.
- To be able to address power quality problems with various mitigation techniques.

UNIT-I:

Power quality problems – definitions, causes and effects: Voltage sag, Voltage swells, Voltage spikes, Voltage notches, Voltage fluctuations, Over/Under voltages, Interruptions, transients, unbalance and Harmonics. Causes and effects of power quality disturbances on various equipment's and systems. Overview of power quality phenomenon, compensation techniques and Power quality Standards. Power outages/Interruptions indices: SAIFI, CAIFI, SAIFI, CAIDI, MAIFI. Voltage sag indices: Voltage sag energy, Voltage sag lost energy index (VSLEI), Harmonic Distortion indices.

UNIT-II:

Single phase circuits power definitions and its components: Power terms in a single-phase system- Active power, Reactive power, Apparent power, Non-active power, Distortion power and power factor- for sinusoidal voltage source supplying linear and non-linear load current, Non-sinusoidal voltage supplying non-linear loads.

UNIT III:

Three phase circuits power definitions and its components:

Balanced/unbalanced Sinusoidal Supply system: Balanced system -Three-phase instantaneous active and reactive power, power invariance in *abc* and *αβ0* coordinates. Unbalance system - Symmetrical components of phasor quantities, Instantaneous symmetrical components, Instantaneous real and reactive powers, positive sequence powers and unbalance power. Apparent power – Arithmetic, Vector and Effective apparent power and power factor.

Three-phase non-sinusoidal balanced/unbalanced system: Three-phase instantaneous active, reactive powers and oscillatory and distorted powers. Neutral current, Line to Line voltage, apparent power with budeanu resolution for balanced distortion case. Effective apparent power for balanced non- sinusoidal systems. Three phase unbalanced non-sinusoidal system: Three-phase instantaneous powers, Arithmetic and Vector Apparent Power with Budeanu's Resolution, Effective apparent power.

UNIT-IV:

Passive power compensation: Passive Compensators Introduction, Classification of passive shunt and series compensators, Principle of operation, Analysis and design of shunt compensators for single- phase/three-phase power factor correction and zero voltage regulation.

UNIT-V:

Passive power filters: Introduction, classification of passive filters, Principle of operation, Analysis and design of shunt passive power filters, parallel resonance and its mitigation.

Text Books:

1. Ghosh, Arindam, and Gerard Ledwich. Power quality enhancement using custom power devices. Springer Science & Business Media, 2012.
2. Singh, Bhim, Ambrish Chandra, and Kamal Al-Haddad. Power quality: problems and mitigation techniques. John Wiley & Sons, 2014.

References:

1. Bollen, Math HJ. "Understanding power quality problems. Voltage sags and Interruptions". IEEE press, 2000.
2. Chattopadhyay, Surajit, Madhuchhanda Mitra, and Samarjit Sengupta. "Electric power quality." Electric Power Quality. Springer, Dordrecht, 2011.

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Know the terminology, definitions, causes, effects and analysis of various power quality problems.

CO2: Define and understand the components of current/power in sinusoidal/non-sinusoidal single-phase supply/load systems.

CO3: Define and understand the components of current/power in sinusoidal/non-sinusoidal three phase supply/load systems.

CO4: Know design, operation and Analysis of passive shunt and series compensators.

CO5: Know design, operation and analysis of passive shunt/series power filters.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ELECTRIC AND HYBRID VEHICLES
(PROFESSIONAL ELECTIVE-VI)

B. TECH- VIII SEM. (EEE) **L/T/P/C**
3/0/0/3

Pre-Requisites:
Electrical Machines I &II

Course Objective:

- To introduce the electric vehicle technology.
- To provide knowledge on the design components in electric vehicle technologies.

UNIT I:
Electric Vehicles: Introduction, Components, vehicle mechanics – Roadway fundamentals, vehicle kinetics, Dynamics of vehicle motion - Propulsion System Design.

UNIT II:
Battery: Basics – Types, Parameters – Capacity, Discharge rate, State of charge, state of Discharge, Depth of Discharge, Technical characteristics, Battery pack Design, Properties of Batteries.

UNIT III:
DC & AC Electrical Machines: Motor and Engine rating, Requirements, DC machines, Three phase AC machines, Induction machines, permanent magnet machines, switched reluctance machines.

UNIT IV:
Electric Vehicle Drive Train: Transmission configuration, Components – gears, differential, clutch, brakes regenerative braking, motor sizing.

UNIT V:
Hybrid Electric Vehicles: Types – series, parallel and series, parallel configuration – Design – Drive train, sizing of components.

Text books:

1. Iqbal Hussain, "Electric & Hybrid Vehicles Design Fundamentals", 2nd Edition, CRC Press, 2011.
2. James Larminie, "Electric Vehicle Technology Explained", John Wiley & Sons, 2003.

References:

1. Mehrdad Ehsani, Yimin Gao, Ali Emadi, "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals", CRC Press, 2010.
2. Sandeep Dhameja, "Electric Vehicle Battery Systems", Newnes, 2000
3. http://nptel.ac.in/courses/108103009

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Know the fundamentals of Electric Vehicles.
CO2: Gain the knowledge on battery technology used in EVs.
CO3: Understand the AC DC motor requirements for EVs.
CO4: Know the drive train components.
CO5: Get the exposure on fundamentals of Hybrid EVs design.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
SMART GRIDS
(PROFESSIONAL ELECTIVE-VI)

B. TECH- VIII SEM. (EEE) **L/T/P/C**
3/0/0/3

Pre-Requisites:

None

Course Objective:

- This subject deals with the fundamentals of smart grids.
- It gives the detailed study of various technologies involved in smart grids.

UNIT I:

Introduction to Smart Grid: Introduction to Smart Grid - Working definitions of Smart Grid and associated Concepts – Smart Grid Functions – Traditional Power Grid and Smart Grid – Standards for Smart Grid – Advantages – Indian Smart Grid –National Smart Grid mission (NSGM) by Govt. of India - Key Challenges for Smart Grid in India.

UNIT II:

Smart Grid Architecture: Components and Architecture of Smart Grid Design – Review of the proposed architectures for Smart Grid. The fundamental components of Smart Grid designs – Transmission Automation – Distribution Automation – Substation automation – Renewable Integration.

UNIT III:

Communication Technologies: Introduction to Communication Technology –Supervisory control and data acquisition (SCADA), energy management system (EMS), Synchro-Phasor Measurement Units (PMUs) – Wide Area Measurement Systems (WAMS).

UNIT IV:

Smart Distribution Technologies: Outage Management Systems (OMS), Automated Meter Reading (AMR), Automated Metering Infrastructure (AMI), Fault Location Isolation and Service Restoration (FLISR) – Distributed energy resources (DERs), smart appliances, Net Metering. Low Voltage DC (LVDC) distribution in homes / buildings, Home Energy Management System (HEMS), Building to Grid B2G, Vehicle to Grid V2G, Solar to Grid, Energy Storage Technologies.

UNIT V:

Regulations and Market Models for Smart Grid: Demand Response, Tariff Design, Time of the Day pricing (TOD), Time of Use pricing (TOU), Consumer privacy and data protection, consumer engagement etc. Cost benefit analysis of smart grid projects.

Text Books:

1. Clark W Gellings, "The Smart Grid, Enabling Energy Efficiency and Demand Side Response"- CRC Press, 2009.
2. Stuart Borlase, "Smart Grids, Infrastructure, Technology and Solutions", CRC Press,2013

References:

1. Janaka Ekanayake, Kithsiri Liyanage, Jianzhong. Wu, Akihiko Yokoyama, Nick Jenkins, "Smart Grid: Technology and Applications"- Wiley, 2012.
2. Jean Claude Sabonnadière, Nouredine Hadjsaïd, "Smart Grids", Wiley-ISTE, IEEE Press, May 2012.
3. A.G. Phadke and J.S. Thorp, "Synchronized Phasor Measurements and their Applications", Springer Edition, 2010.
4. Gil Masters, "Renewable and Efficient Electric Power System", Wiley–IEEE Press, 2004.
5. T. Ackermann, "Wind Power in Power Systems", Hoboken, NJ, USA, John Wiley,2005
6. James Momoh, "Smart Grid: Fundamentals of Design and Analysis" – Wiley, IEEE Press, 2012.
7. India Smart Grid Knowledge Portal
8. NPTEL course on Smart Grids

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Understand technologies for smart grid and features of Smart Grid in the context of Indian Grid.

CO2: Assess the role of automation in Transmission/Distribution/substation.

CO3: Know various communication technologies involved in smart grids and importance of PMUs, EMS, WAMS, SCADA

CO4: Classify various Smart Distribution Technologies

CO5: Clarify the regulations and market models for smart grid and various tariffs

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
EMBEDDED SYSTEMS
(PROFESSIONAL ELECTIVE-VI)

B. TECH – VII Semester **L/T/P/C**
3/0 /0 /3

Pre-Requisites: Microprocessors & Microcontrollers

Course Objectives

For embedded systems, the course will enable the students to:

- Understand the basics of an embedded system
- Understand the architecture of ARM Processor, instruction set and assembly language programming
- To Introduce I/O devices, Bus Communication in processors, Input/output interfacing
- Understand the Memory Interfacing, Memory selection for Embedded Systems
- Design, implement and test an embedded system

UNIT I

Introduction to Embedded Systems: Definition of Embedded System, Embedded Systems Vs General Computing Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics of Embedded Systems, the History of ARM and Microcontrollers.

UNIT II

ARM 32 Bit MCU's: Introduction to 16/32 Bit processors, ARM architecture and organization, ARM / Thumb programming model, ARM / Thumb instruction set ,differences between ARM and Thumb instruction set, ARM assembly language programming, ARM development tools.
LPC2148 ARM CPU'S: Features, pin configuration, block diagram, memory mapping, and applications.

UNIT III

LPC2148 Peripherals: GPIO-Features, applications, timer/counter, PWM, ADC, DAC, Real time clock, watch dog timer, displays.
Communication Interface: Onboard Communication Interfaces: I2C, SPI, UART, Parallel interface, External Communication Interfaces: RS232, USB, IEEE1394 (Fire wire), Infrared Devices, Bluetooth, Zig Bee, Wi-Fi, GPRS

UNIT IV

Typical Embedded System: Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off- The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators.

UNIT V

Embedded Firmware: Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Embedded Firmware Design Approaches and Development Languages.

Text Book

1. Introduction to Embedded Systems – Shibu K.V, Mc Graw Hill.
2. Architecture, Programming, interfacing and system design-Raj Kamal, Pearson Education
3. ARM Assembly Language Programming and Architecture-Muhammad Ali Mazidi,Sarmad Naimi,Sepehr Naimi,Janice Mazidi

Reference Books

1. Philips semiconductors UM10139 Vol.01 :LPC214X User Manual
2.Embedded Systems Raj Kamal, TMH

Course Outcomes

Upon completion of this course, the student will be able to:

CO1: Understand and design embedded systems.
CO2: Understand the architecture of Arm processors.
CO3: Develop a system using IO devices and interfacing to external world.
CO4: Understand types of memory.
CO5: Understand embedded firmware design approaches.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

TECHNICAL SEMENAR

B. TECH- VII SEM. (EEE) **L/T/P/C**
0/0/2/1

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
MAJOR PROJECT PHASE-II

B. TECH- VII SEM. (EEE) **L/T/P/C**

0/0/16/8

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DISASTER PREPAREDNESS & PLANNING MANAGEMENT
(OPEN ELECTIVE – CIVIL ENGINEERING)

B.Tech –EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-Requisites–No prerequisites are needed for enrolling into the course

Course Objectives:
- To Know about the state of art of disaster management in world
- To Study the various natural disasters and its mitigation measures
- To understand human induced Hazards and its case studies
- To impart knowledge on remote sensing and GIS
- To expose students to various technologies used for disaster mitigation and management.

UNIT – I : Introduction
Hazard, vulnerability and risk, Types of disasters, Disaster management cycle, role of civil engineers in disaster management, Progress of disaster management in world, vulnerability profile of India, Disaster management act, Disaster management in India

UNIT – II : Natural Disasters
Hydro - meteorological based disasters –Tropical cyclones, floods, drought and desertification zones, Geographical based disasters – Earthquake, Tsunamis, Landslides and avalanches – Causes, Types, effects and Mitigation measures, coastal zone management

UNIT – III : Human induced hazards
Human induced hazards: chemical industrial hazards, major power breakdowns, traffic accidents, etc. Case studies

UNIT - IV: Remote sensing and GIS for Disaster Management
Introduction to remote sensing and GIS, its applications in disaster mitigation and management, case studies

UNIT - V: Disaster Management
Risk assessment and hazard mapping –mitigation and management options – warning and forecasting

Course Outcomes
On completion of the course, the students will be able to,
CO 1: Attain knowledge on various types, stages, phases in disaster management
CO 2: Recognize various types of natural disaster, Mitigation and Management Systems
CO 3: Know the different types of manmade disasters and its effects
CO 4: Explain Remote sensing technology and GIS in disaster mitigation and management.
CO 5: Know the concepts of risk, warning and forecasting methods in disaster management

TEXT BOOKS:
1. Pradeep Sahni, "Disaster Risk Reduction in South Asia", Prentice Hall, First Edition, 2003
2. Singh B.K., "Handbook of Disaster Management: Techniques & Guidelines", Rajat Publication, 2008
3. Ghosh G.K., "Disaster Management", APH Publishing Corporation, First Edition, 2011

REFERENCE BOOKS:

1. Rajib, S and Krishna Murthy, R.R. "Disaster Management Global Challenges andLocal Solutions", Universities Press, First Edition, 2012
2. Navele, P & Raja, C.K., "Earth and Atmospheric Disasters Management, Natural and Manmade", B.S. Publications, First Edition, 2019
3. Tushar Battacharya., "Disaster Science and Management", Tata McGraw Hill Company, 2012

Online Resources:

1. https://nptel.ac.in/courses/105/104/105104183/
2. https://nptel.ac.in/courses/124/107/124107010/

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ENVIRONMENTAL MANAGEMENT
(OPEN ELECTIVE – CIVIL ENGINEERING)

B.Tech –EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre Requisites –No prerequisites are needed for enrolling into the course

Course Objectives:
- To introduce the environmental management policies and legal aspects in India
- To study the various steps involved in Environment management system standard
- To understand the importance of Environmental Impact Assessment
- To know about the environment management plan
- To know about the Environmental management techniques and control measure

UNIT – I : Introduction to Environmental Management
Scope and nature of Environment Management - its need and brief discussion on the ethical, legal and financial reasons for Environment Management, the framework and approach to develop Environment management system, Policies and legal aspect in India

UNIT – II : Environment management system (EMS) standard
Guideline to implement effective Environment management system, core element of EMS, EMS standard: ISO 14000, its evolution, principle and specification, benefit of EMS. Planning and its implementation, Comparison of other standards with ISO 14000

UNIT – III : Environmental Impact Assessment
EIA definition, its need and principle, scoping, screening and the baseline condition, different methodologies, Impact identification and decision making, EIA case studies in India

UNIT - IV : Environment management plan
Planning and identification of baseline condition and impact, monitoring and evaluation of risk, mitigation plan, legislation and environmental audit, disaster management plan, Life cycle assessment and risk analysis

UNIT – V : Environmental management techniques and control measure
Environmental monitoring, modelling and risk assessment, Implementation of sustainable design, control measure for different environment pollution such as air pollution, water pollution, soil and noise pollution

Course Outcomes:
On completion of the course, the students will be able to,

CO1 : Comprehend the need for Environmental Management
CO2 : Identify the attributes of Environment Management system and standards
CO3 : Apply different methodologies for impact assessment
CO4 : To understand the various Environment management plan
CO5 : Identify the techniques and control measures for Environment management

TEXT BOOKS:
1. John Pallister ., Environmental Management, Oxford University Press,2nd Edition,2017
2. Ajith Sankar., Environmental Management, Oxford University Press, First Edition, 2015
3. Krishnamoorthy Bala., Environmental Management, PHI Learning,3rd Edition,2017

REFERENCE BOOKS:

1. V Murali Krishna, Valli Manickam., Environmental Management, ELSEVIER, 1st Edition, 2017
2. Jacob Thomas ., Environmental Management, Pearson Education India.1st Edition,2014
3. M.C. Dash., Concepts of Environmental Management for Sustainable Development, Dreamtech Press &Wiley, First Edition, 2019

Online Resources:

1. https://nptel.ac.in/courses/120/108/120108004/

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

URBAN PLANNING
(OPEN ELECTIVE – CIVIL ENGINEERING)

B.Tech –EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre Requisites –No prerequisites are needed for enrolling into the course

Course Objectives:
- To introduce the history of town planning and its importance
- To study the various steps involved in urban planning and its methods
- To know the importance of housing development
- To understand the importance of public transport and non-motorized transport.
- To introduce the concept of smart cities in India

UNIT – I : Introduction
History of Town Planning - Definitions and Objectives of Planning - Examples of planned and unplanned cities - Retrofitting medieval towns and existing cities - Healthy city planning

UNIT – II : Basic Planning Methods
Base map preparation - survey techniques - Analytical methods - region classification -
Demographic methods - population forecasting - Introduction of Remote sensing, GIS and GPS in urban planning context - Regional planning

UNIT – III : Housing Development
Policies and schemes - Housing typologies - Housing for the poor and elderly - Housing finance options – under privileged population management - Planning and management of local streets, water supply and storm water drainage - municipal solid waste management systems - new possibilities for recycling.

UNIT – IV : Transport and Mobility
Costs of congestion - Public and Para-transit modes (taxis and autos) - Feeder systems for the use of public transport - non-motorized transport facilities - cycling and walking infrastructure – Integrated public transport

UNIT – V: Smart Cities
Smart city developments across the world - Specific priorities for Smart Cities in India – Leveraging recent technologies in enhancing urban living: internet of things (IoT) - Recreation - Renewable energy - green corridors, green space and green buildings - Safety and security of urban population.

Course Outcomes:
On completion of the course, the students will be able to,

CO1 : Describe the importance of proper urban planning for a healthy city
CO2 : Apply basic methods for urban planning
CO3 : Describe housing development schemes
CO4 : Design public transport and non-motorized transport facilities for a city
CO5 : Describe smart city developments in India and abroad and its various elements

TEXT BOOKS:

1. Peter Hall, Mark Tewdwr-Jones, Urban and Regional Planning. Taylor & Francis, 6th Edition, 2019
2. Joy Sen., Sustainable Urban Planning. The Energy and Resources Institute, New Delhi, 2013 Edition, 2013
3. Rao M. P., Urban Planning Theory And Practice, CBS Publishers,Revised Edition, 2019

REFERENCE BOOKS:

1. Peter Hall, Cities of Tomorrow: An Intellectual History of Urban Planning and Design Since 1880, Wiley-Blackwell, 4th Edition, 2014
2. Randall Crane and Rachel Weber, The Oxford Handbook of Urban Planning. Oxford University Press, 2012
3. Amiya Kumar Das., Urban Planning in India, Rawat Pubns,First Edition 2007

Online Resources:

1. https://nptel.ac.in/courses/124/107/124107158/

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ELECTRICAL POWER UTILISATION AND SAFETY
(OPEN ELECTIVE – ELECTRICAL AND ELECTRONICS ENGINEERING)

B.Tech –CIVIL, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites: None

Course Objectives:

- To provide information of importance various parameters in electrical system.
- To analyze and design illumination scheme, electrification, earthing system and protection system for anapplication.

Unit-I:

Electric Heating and Welding Advantages of electric heating, resistance heating, types of furnaces, induction heating, types of induction furnaces, dielectric heating, types of welding- arc and resistance

Unit-II:

IlluminationScheme Basic terms used in illumination scheme, Electric lamps, Recommended levels of illumination, types of lighting schemes, design of lighting schemes, factory lighting, street lighting, flood lighting

Unit-III:

Electrical Installation, Estimating andCosting Types of loads, Load assessment, Electrical supply systems, wiring systems, Permissible voltage drops and conductor size calculations, Estimating and costing for residential and commercial service connections (single phase and three phase)

Unit-IV:

Power Factor Effects of power factor, causes of low power factor, disadvantages of low power factor, methods of improving power factor, most economical power factor.

Unit-V:

Electrical Safety, Earthing System and Protective Devices Electrical shock mechanisms, factors influencing the electric shock, body current thresholds (tolerable body current limit), thevenin's concepts and accidental equivalent circuits (step and touch potentials), protection against electric shock, purpose of earthing, IS rules for earthing of electrical installations, factors governing the resistance of earth electrode, methods of earthing, measurement of earth resistance, methods of reducing earth resistance, fuse, miniature circuit breakers (MCB) and earth leakage circuit breakers (ELCB).

Text Books:

1. E. Openshaw Taylor, Utilisation of Electrical Energy, Universities Press.
2. H. Partab, Art and Science of Utilisation of Electrical Energy, Dhanpat Rai & Co.
3. J. B. Gupta, Utilization of Electric Power and Electric Traction, S. K. Kataria & Sons, New Delhi.
4. G. C. Garg, Utilization of Electric Power and Electric Traction, Khanna Publishers, Delhi.
5. R. K. Rajput, Utilisation of Electrical Power, Laxmi Publications (P) Ltd., New Delhi.

References:

1. N. V. Suyranarayana, Utilisation of Electric Power Including Electric Drives and Electric Traction,NewAge Publishers, New Delhi.
2. J. B. Gupta, A Course in Electrical Installation Estimating and Costing, S. K. Kataria & Sons, NewDelhi.
3. Dr. J. G. Jamnani, Elements of Electrical Design, Mahajan Publishing House

Course outcomes:

On successful completion of this course, students are able to:
CO1: Know about the electric heating and welding
CO2: Gain the knowledge on illumination system.
CO3: Understand the electrical installation, estimation and costing.
CO4: Understand the importance of power factor.
CO5: Gain the knowledge on safety and protection.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

CONCEPTS OF CONTROL SYSTEMS
(OPEN ELECTIVE – ELECTRICAL AND ELECTRONICS ENGINEERING)

B.Tech –CIVIL, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites: None

Course Objectives:

- To understand the different ways of system representations such as Transfer functionrepresentation and state space representations and to assess the system dynamic response.
- To assess the system performance using time domain analysis and methods for improving it.

Unit-I:

Basic concepts of control system: Terminology - plant, process, system, disturbances, controlled variable, manipulated variable etc., Block diagram of basic control system, application areas with examples. Classifications of control systems, Concept of superposition for linear systems with examples.

Unit-II:

Mathematical modelling of systems: Translational and rotational mechanical systems, electrical systems, Force voltage and force current analogy, Position servo mechanism. Block diagram and signal flow graph representation of physical systems along with rules, properties, comparison and limitation, Mason's gain formula.

Unit-III:

Time response analysis: Standard test signals along with examples of their usage, steady state errors for step, ramp and parabolic inputs, analysis of first and second order systems, Transient response specifications with numerical examples, Basic control actions and two position, proportional, PI, PID and rate feedback controllers, Limitations of time domain analysis.

Unit-IV:

Frequency response analysis: Need of frequency response analysis, Sinusoidal response of linear system, methods used in frequency response, Frequency domain specifications.

Unit-V:

Stability: Concept of stability, types of stability, Routh's stability criterion, special cases with numerical examples, stability of closed loop system, concept of root locus, open loop and closed loop transfer poles, step by step procedure for root loci, numerical examples.

Text Books:

1. Katsuhiko Ogata, Modern control theory, Pearson Education International, Fifth edition.
2. Norman S Nise, Control system engineering, John Wiley & Sons, Inc., Sixth edition
3. Richard C. Dorf, Robert H Bishop, Modern control systems, Pearson Education International,Twelfth edition.

References:
1. Farid Golnaraghi, Benjamin C Kuo, Automatic control systems, John Wiley & Sons, Inc.,Nineth edition
2. J.Nagrath and M.Gopal,Control System Engineering, New Age International Publishers,5th Edition, 2007

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Understand the basic concept control systems.
CO2: Know the mathematical model of the systems.
CO3: Estimate the time domain specifications and steady state error.
CO4: Know the frequency response analysis.
CO5: Understand concept of stability.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

RENEWABLE ENERGY SOURCES
(OPEN ELECTIVE – ELECTRICAL AND ELECTRONICS ENGINEERING)

B.Tech –CIVIL, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites: None

Course Objectives:

- To introduce to the technology of renewable sources of energy.
- To learn about the solar radiation, its applications and radiation measuring instruments.
- To study the Geothermal biomass energy resources, biomass systems.
- To learn the methods of energy extraction from the wind and oceans.

Unit-I:

Global and National Energy Scenario: Over view of conventional & renewable energy sources, need, potential &development of renewable energy sources, types of renewable energy systems, Future of Energy Use, Global and Indian Energy scenario, Energy for sustainable development, renewable electricity and key elements, Global climate change, CO2 reduction potential of renewable energy- concept of Hybrid systems

Unit–II:

Solar Energy: Solar energy system, Solar Radiation, Availability, Measurement and Estimation, Solar Thermal Conversion Devices and Storage, Solar-Electrical Power Generation, general Solar Photo Voltaic (SVP) system, Different configurations, SPV system components and their characteristics, Stand-Alone and Grid Connected SPV systems, other Miscellaneous Applications of Solar Energy.

Unit–III:

Wind Energy: Wind Energy Conversion, Potential, Nature of the wind, Wind Data and Energy Estimation, Site selection, Types of wind turbines, Wind farms, Wind Generation and Control., classification of wind, characteristics, offshore wind energy – Hybrid systems, wind energy potential and installation in India

Unit -IV:

Hydel and Tidal Power Systems: Basic working principle, Classification of hydel systems: Large, small, micro – measurement of head and flow – Energy equation – Types of turbines – Numerical problems. Tidal power – Basics – Kinetic energy equation – Numerical problems – Wave power – Basics – Kinetic energy equation.

Unit- V:

Bio-Mass, Geothermal& Ocean Energy: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I. C. Engine operation and economic aspects. Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India. Ocean Energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles.

Text Books:

1. Godfrey Boyle, Renewable Energy,Oxford university, press, 3rd edition, 2013.
2. Ahmed and Zobaa, Ramesh C Bansal, Handbook of renewable technology World scientific, Singapore.
3. Ramesh & Kumar, Renewable Energy Technologies, Narosa.
4. Chetong Singh Solanki, Renewable energy technologies – A practical guide for beginners –, PHI.

References:

1. B.H. Khan, Non-conventional energy source TMH-2nd edition.

2. Karlsson, Kenneth Bernard; Skytte, Klaus Morthorst, Integrated energy systems modeling, DTU International Energy Report 2015.

Course outcomes:

On successful completion of this course, students are able to:

CO1: Know about the global and national energy scenario.
CO2: Understand the concept of solar energy.
CO3: Know the basics of wind energy.
CO4: Differentiate the hydel and tidal power plants.
CO5: Explore the bio-mass, geothermal and ocean energy.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

NON-CONVENTIONAL ENERGY SOURCES
(OPEN ELECTIVE – MECHANICAL ENGINEERING)

B.Tech –CIVIL, EEE, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisite – Nil

COURSE OBJECTIVES:

- Introduce to the technology of renewable sources of energy
- Learn about the solar radiation, its applications and radiation measuring instruments
- Learn about the various types of geothermal resources and its applications
- Study the biomass energy resources, bio-mass systems.
- Learn the methods of energy extraction from the wind and oceans learn to the technologyof direct energy conversion methods

UNIT – I

PRINCIPLES OF SOLAR RADIATION:

Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiationand sun shine, solar radiation data.

UNIT – II

SOLAR ENERGY COLLECTION:

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

SOLAR ENERGY STORAGE AND APPLICATIONS:

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaicenergy conversion.

UNIT – III

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria.

BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Biogas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C. Engine operation and economic aspects.

UNIT – IV

GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, Potential in India.

OCEAN ENERGY: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT – V

DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, limitations and principles of DEC. Thermoelectric generators, see beck, pettier and joule Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

COURSE OUTCOMES:

The students will be able to

CO1 Apply the technology to capture the energy from the renewable sources like sun, Wind,ocean, biomass, geothermal.

CO2 Use different renewable energy sources to produce electrical power minimize the use ofconventional energy sources to produce electrical energy

CO3 Identify the fact that the conventional energy resources are depleted

CO4 Understand direct energy conversion

CO5 Learn different methods in solar energy system.

TEXTBOOKS:

1. Non-Conventional Energy Sources /G.D. Rai
2. Renewable Energy Technologies /Ramesh & Kumar /Narosa

REFERENCE BOOKS:

1. Renewable energy resources/ Tiwari and Ghosal/ Narosa.
2. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
3. Non-Conventional Energy Systems / K Mittal /Wheeler
4. Solar Energy /Sukhame

ONLINE RESOURCES:

1. NPTEL Course: Non-Conventional Energy Resources by Dr. Prathap Haridoss, IIT Madras.

Link: https://nptel.ac.in/courses/121/106/121106014/

2. NPTEL Course: Non-Conventional Energy Systems by Prof. L. Umanand, IISc Bangalore.

Link: https://nptel.ac.in/courses/108/108/108108078/

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ROBOTICS
(OPEN ELECTIVE – MECHANICAL ENGINEERING)

B.Tech –CIVIL, EEE, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisite – Nil

COURSE OBJECTIVES:

- Students will be able to understand the concepts of robotics – classification by coordinatesystem and control system.
- Students will be able to determine the degrees of freedom, end effectors, electrichydraulic and pneumatic devices.
- Students will possess the concepts of homogeneous transformations.
- Student will understand the Jacobean problems, Newton – Euler transmations.
- Students will know about the actuators and feedback components, resolvers, encoders -velocity sensors.
- Students will be able to know the applications of robots in manufacturing.

UNIT – I INTRODUCTION

Automation and Robotics – An over view of Robotics – classification by coordinate system and control systems – Components of Industrial Robotics: Degrees of freedom – End effectors: Types of grippers: Mechanical, Magnetic, Vacuum cup – General considerations on gripper selection and design.

UNIT – II

MOTION ANALYSIS

Basic rotation matrices – Composite rotation matrices – Euler Angles – Equivalent Angleand Axis – Homogeneous transformation – Problems.

Manipulator Kinematics: D.H.Notation– Joint coordinates and world coordinates –Forward and inverse kinematics – problems.

Differential Kinematics: Differential kinematics of planar and spherical manipulators –Jacobians – Problems.

UNIT – III

ROBOT DYNAMICS

Lagrange – Euler formulations – Newton – Euler formulations – Problems on planar twolink manipulators.

UNIT – IV

TRAJECTORY PLANNING

Joint space scheme – cubic polynomial fit – Avoidance of obstacles – Types of motion – Slew motion – Joint interpolated motion – straight line motion – problems.

UNIT – V

ROBOT ACTUATORS AND FED BACK COMPONENTS

Actuators: Pneumatic and Hydraulic actuators. Electric Actuators: DC servo motors – stepper motors. Feedback components: position sensors – potentiometers, resolvers and encoders – Velocity sensors – Tactile sensors.

Robot Application in Manufacturing: Material handling – Assembly and Inspection.

COURSE OUTCOMES:

The students will be able to

CO1 Apply the knowledge of robotics in real time human life applications.
CO2 Analyse the concept of CAD/CAM and automation to the robotics.
CO3 Compare knowledge of robot applications in manufacturing like, material handling, loading and unloading etc.
CO4 Experiment the robotics to the spot and continuous arc welding and spray painting.
CO5 Relate the Robot Application in Manufacturing.

TEXTBOOKS:

1. Groover M P, "Industrial Robotics", Pearson Edu., 2012 1st Edition, ISBN Number:0070265097, 9780070265097, 978-0070265097.
2. JJ Craig, "Introduction to Robotic Mechanics and Control", Pearson, 2008 3rd edition.ISBN-13: 978-0201543612

REFERENCE BOOKS:

1. Fu K S, "Robotics", McGraw Hill, 1st Ed., 2008, ISBN 13: 9780070226258.
2. Richard D.Klafter, "Robotic Engineering", Prentice Hall, 1st Ed., 1989, ISBN-13:9780137820535.

ONLINE RESOURCES:

1. NPTEL Course: Introduction to Robotics by Dr. Balaraman Ravindran, IIT Madras.Link: https://nptel.ac.in/courses/107/106/107106090/
2. NPTEL Course: Introduction to Robotics by Prof. Ashish Dutta, IIT Kanpur.Link: https://nptel.ac.in/courses/112/104/112104298/
3. http://www.robogrok.com/index.html

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

MECHATRONICS
(OPEN ELECTIVE – MECHANICAL ENGINEERING)

B.Tech –CIVIL, EEE, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisite – Nil

COURSE OBJECTIVES:

- Know the basic concepts of mechatronics.
- Know the various actuating systems like Hydraulic, pneumatic, mechanical and electrical actuating system.
- Know about the micro processor and micro controllers.
- Know about the system and interfacing and data acquisition.

UNIT – I

Mechatronics systems, elements, levels of mechatronics system, Mechatronics design system, measurement systems, control systems, microprocessor-based controllers, advantages and displacement, position, proximity, velocity, motion, force, acceleration, torque, fluid pressure, liquid flow, liquid level, temperature and light sensors.

UNIT – II

Solid state electronic devices, PN Junction diode, BJT, FET, DIA and TRIAC. Analog signal conditioning, amplifiers, filtering. Introduction to MEMS & typical applications.

UNIT – III

Hydraulic and pneumatic actuating systems, Fluid systems, Hydraulic and pneumatic systems, components, control valves, electro-pneumatic, hydro-pneumatic, electro-hydraulic servo systems: Mechanical actuating systems and electrical actuating systems.

UNIT – IV

Digital electronics and systems, digital logic control, micro processors and micro controllers, programming, process controllers, programmable logic controllers, PLCs versus computers, application of PLCs for control.

UNIT – V

System and interfacing and data acquisition , DAQS, SCADA, A to D and D to A conversions; Dynamic models and analogies, System response . Design of mechatronics systems & future trends.

COURSE OUTCOMES:

The students will be able to

CO1 Use the control system, mechatronics design systems and measurement systems.
CO2 Work on various actuating systems.
CO3 Convert the signals from one form to another form.
CO4 Estimate the micro controllers and micro processors.
CO5 Develop the simple programming code for PLC's.

TEXTBOOKS:

1. Mechatronics Integrated Mechanical Electronics Systems/KP Ramachandran &GKVijaya Raghavan/WILEY india Edition/2008
2. Mechatronics Electronics control systems in Mechanical andElectrical Engineering/W Bolton/Pearson Education press/3rd edition,2005.

REFERENCE BOOKS:

1. Mechatronics Source books by Newton C Braga, Thomson Publications, Chennai.
2. Mechatronics – N.Shanmugam/ Anuradha Agencies Publishers.
3. Mechatronics System Design/Devdas shetty/Richard/Thomson.

ONLINE RESOURCES:

1. NPTEL Course: Mechatronics by Prof. Pushparaj Mani Pathak, IIT Roorkee.Link: https://nptel.ac.in/courses/112/107/112107298/
2. NPTEL Course: Mechatronics and Manufacturing Automation by Dr. Shrikrishna N.Joshi, IIT Guwahati.

Link: https://nptel.ac.in/courses/112/103/112103174/

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DIGITAL IMAGE PROCESSING
(OPEN ELECTIVE – ELECTRONICS & COMMUNICATION ENGINEERING)

B.Tech –CIVIL, EEE, MECH, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre Requisites: None

Course Objectives

- To familiarize the students with digital image fundamentals.
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To Understand the concepts of image compression techniques.

UNIT- I

Digital Image Fundamentals & Image Transforms: Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels,

Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

UNIT -II

Image Enhancement (Spatial Domain): Introduction, Image Enhancement in Spatial Domain: Enhancement through Point Operation, Types of Point Operation, Histogram Manipulation, Linear and Non — Linear Gray Level Transformation, Spatial domain filtering.

Image Enhancement (Frequency Domain): Low Pass (Smoothing) filters, High Pass (Sharpening) filters and Homomorphism filtering.

UNIT -III

Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT-IV

Image Segmentation: Detection of Discontinuities, Edge Linking And Boundary Detection, Thresholding, Region based Segmentation.

Morphological Image Processing: Dilation and Erosion operations, Opening and Closing operations, Hit or Miss Transformation.

UNIT-V

Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

Text Books

1. Digital Image Processing – Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008
2. Fundamentals of Digital Image Processing — A.K.Jain, PHI, 1989

Reference Books

1. Digital Image Processing using MATLAB — Rafael C. Gonzalez, Richard E Woods and Steven L.Eddings, 2nd Edition, TMH, 2010.

2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- TMH, 2010.

3. Digital Image Processing with MATLAB & Labview — Vipula Singh, Elsevier.

Course Outcomes

After completion of this course students able to

CO1 Gain the knowledge of digital image fundamentals and image transforms.
CO2 Understand image enhancement in spatial and frequency domain.
CO3 Understand the different methods to restore an image.
CO4 Analyze image segmentation techniques and morphological image processing.
CO5 Analyze the different image compression techniques.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

WIRELESS AND MOBILE COMMUNICATION
(OPEN ELECTIVE – ELECTRONICS & COMMUNICATION ENGINEERING)

B.Tech –CIVIL, EEE, MECH, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre Requisites: None

Course Objectives

- To provide the student with an understanding of the Cellular concept, Frequency reuse, Hand-off strategies.
- To enable the student to analyze and understand wireless and mobile cellular communication systems over a stochastic fading channel
- ToprovidethestudentwithanunderstandingofCo-channelandNon-Co-channelinterference
- To give the student an understanding of cell coverage for signal and traffic, diversity techniques and mobile antennas.
- To give the student an understanding of frequency management, Channel assignment and types of hand off.

UNIT - I

Introduction to Cellular Mobile Radio Systems: Limitations of Conventional Mobile Telephone Systems, Basic Cellular Mobile System, First, Second, Third and Fourth Generation Cellular Wireless Systems, Uniqueness of Mobile Radio Environment- Fading, Coherence Bandwidth, Delay Spread, Doppler Spread and Coherence Time. Fundamentals of Cellular Radio System Design: Concept of Frequency Reuse, Co-Channel Interference, Co-Channel Interference Reduction Factor, Desired C/I From a Normal Case in a Omni Directional Antenna System, Trunking and Grade of Service, ImprovingCoverageandCapacityinCellularSystems-CellSplitting,Sectoring,MicrocellZoneConcept.

UNIT - II

Co-Channel Interference: Measurement Of Real Time Co-Channel Interference, Design of Antenna System, Diversity Techniques-Space Diversity, Polarization Diversity, Frequency Diversity, Time Diversity, Directional Diversity. Non-Co-Channel Interference: Adjacent Channel Interference, Near End Far End Interference, Cross Talk, Effects on Coverage and Interference by Power Decrease, Antenna Height Decrease, Effects of Cell Site Components.

UNIT - III

Cell Coverage for Signal and Traffic: Signal Reflections in Flat and Hilly Terrain, Effect of Human Made Structures, Phase Difference Between Direct and Reflected Paths, Constant Standard Deviation, Straight Line Path Loss Slope, General Formula for Mobile Propagation Over water and Flat Open Area, Near and Long Distance Propagation, Path Loss From a Point to Point Prediction Model in Different Conditions, Merits of Lee Model. Cell Site and Mobile Antennas: Space Diversity Antennas, Umbrella Pattern Antennas.

UNIT - IV

Frequency Management and Channel Assignment: Numbering and Grouping, Access and Paging Channels, Channel Assignments to Cell Sites and Mobile Units, Channel Sharing and Borrowing, Sectorization, Overlaid Cells, Non Fixed Channel Assignment.

UNIT - V

Handoffs and Dropped Calls: Handoff Initiation, Types of Handoff, Delaying Handoff, Advantages of Handoff, Power Difference Handoff, Forced Handoff, Mobile Assisted and Soft Handoff, inter system

Handoff, Introduction to Dropped Call Rates and their Evaluation.

Text Books

1. MobileCellularTelecommunications—W.C.Y.Lee,McGrawHill,2ndEdn.,1989.
2. Wireless Communications – Theodore. S. Rapport, Pearson Education, 2nd Edn.,2002.
3. Mobile Cellular Communication – Gottapu sashibhushana Rao, Pearson,2012.

Reference Books

1. PrinciplesofMobileCommunications—GordonL.Stuber,SpringerInternational,2ndEdn.,2001.
2. Modern Wireless Communications-Simon Haykin, Michael Moher,Pearson Education,2005.
3. Wireless Communications Theory and Techniques, Asrar U. H .Sheikh,Springer, 2004.
4. Wireless Communications and Networking, Vijay Garg, Elsevier Publications,2007.
5. Wireless Communications —Andrea Goldsmith, Cambridge University Press,2005.

Course Outcomes

By the end of the course, the student will be able to

CO1 Estimate the impairments due to multi path fading channel.
CO2 Explain an Importance of the fundamental techniques to overcome the different fading effects.
CO3 Distinguish the co-channel and Non co-channel interference.
CO4 Inspect cell coverage for signal and traffic, diversity techniques and mobile antennas.
CO5 Relate and explain the functioning of frequency management, Channel assignment and types of handoff.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

SENSOR NETWORKS
(OPEN ELECTIVE – ELECTRONICS & COMMUNICATION ENGINEERING)

B.Tech –CIVIL, EEE, MECH, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: None

Course Objectives:

- To introduce the various types of sensor & networks in wireless
- To explore the analysis of various sensors & networks

UNIT-I

OVERVIEWOFWIRELESSSENSORNETWORKS: ChallengesforWirelessSensorNetworks,EnablingTechnologiesForWireless Sensor Networks.

UNIT-II

ARCHITECTURES: Single-NodeArchitecture-HardwareComponents,EnergyConsumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Gateway Concepts.

UNIT-III

NETWORKING SENSORS: Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts -S-MAC , The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses.

UNIT-IV

INFRASTRUCTURE ESTABLISHMENT: Topology Control , Clustering, Time Synchronization, Localization and Positioning**.**

UNIT-V

SENSOR NETWORK PLATFORMS AND TOOLS: Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-levels of twareplatforms, Node-level Simulators**.**

TEXTBOOKS

1. HolgerKarl&AndreasWillig,"ProtocolsAndArchitecturesforWirelessSensorNetworks", John Wiley,2005.
2. Feng Zhao &Leonidas J. Guibas, ‐Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.

REFERENCES

1. Kazem Sohraby, Daniel Minoli, &Taieb Znati, ‐Wireless Sensor Networks- Technology, Protocols, And Applications‖,JohnWiley, 2007.
2. AnnaHac, ‐Wireless Sensor Network Designs‖, John Wiley, 2003.

Course Outcomes

At the end of the course, the student will be able to

CO1 Understand the overview of sensor &networks.
CO2 Explore the various architectures of sensors & network
CO3 Uunderstand the various protocols in sensor networks.
CO4 Identify the infrastructure and establishment of sensor networks.
CO5 Explore various sensor network platforms and tools.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

BIOMEDICAL INSTRUMENTATION
(OPEN ELECTIVE – ELECTRONICS & COMMUNICATION ENGINEERING)

B.Tech –CIVIL, EEE, MECH, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre Requisites: None

Course Objectives

The following are the course objectives

- To study bioamplifier, biosignals and measurement of physiological parameters.
- To know about different bioelectrodes and activities of heart.
- To understand therapeutic and cardic instrumentation.
- To study EEG and EMG machines, recordings and interpretations.

UNIT-I

Components of Medical Instrumentation System: Bloamplifier, Static and Dynamic Characteristics of Medical Instruments, Biosignals and Characteristics, Problems encountered with Measurements from Human beings. Organization of Cell, Derivation of Nernst equation for Membrane Resting Potential Generation and Propagation of Action Potential, Conduction through Nerve to Neuromuscular Junction.

UNIT -II

Bio Electrodes: Biopotential Electrodes-External Electrodes, Internal Electrodes, Biochemical Electrodes. Mechanical Function, Electrical Conduction System of the Heart, Cardiac Cycle, Relation between Electrical and Mechanical Activities of the Heart.

UNIT -III

Cardiac Instrumentation: Blood Pressure and Blood Flow Measurement, Specification of ECG Machine, Einthoven Triangle, Standard 12-Lead Configurations, Interpretation of ECG waveform with respect to Electro Mechanical Activity of the Heart.

UNIT -IV

Therapeutic Equipment: Pacemaker, Defibrillator, Shortwave Diathermy, Hemodialysis Machine.
Respiratory Instrumentation: Mechanism of Respiration, Spirometry, Pnemuotachograph Ventilators.

UNIT -V

Neuro-Muscular Instrumentation: Specification of EEG and EMG Machines, Electrode Placement for EEG and EMG Recording, Interpretation of EEG and EMG.

Text Books

1. Biomedical Instrumentation and Measurements — by Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, PHI.
2. Medical Instrumentation, Application and Design — by John G.Webster, John Wiley.

Reference Books

1. Principles of Applied Biomedical Instrumentation — by L.A. Geoddes and L.E. Baker, John Wiley and Sons.
2. Hand-book of Biomedical Instrumentation — by R.S. Khandpur, McGraw-Hill, 2003.

3. Biomedical Telemetry — by Mackay, Stuart R., John Wiley.

Course Outcomes

At the end of the course, the student will be able to

CO1 Understand the functions of bio amplifiers, characteristics of medical instruments and bio signals.

CO2 Discuss the various internal, external Bio electrodes and relations between electrical and mechanical activities of heart.

CO3 Compare various concepts of Cardiac Instrumentation and gain the knowledge about

CO4 Analyze the Therapeutic Equipment and their operation.

CO5 Acquires knowledge about neuro-muscular Instrumentation like ECG EMG and EEG.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATABASE MANAGEMENT SYSTEMS
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: Data Structures, Mathematics-I

Course Objectives:

This Course provides an emphasis on how to organize, maintain and retrieve information efficiently and effectively from a Database and it presents an introduction to data base management systems (DBMS) and relational data model. Also the course introduces the concepts of transactions and transaction processing and the issues and techniques relating to concurrency and recovery in multi-user database environments. .

UNIT- I: Introduction

Database system Applications - Database System versus File Systems - View of Data– Instances and schema - Data Models - Database Languages -DDL-DML - Database Users and Administrator –Transaction Management - Database System Structure-Application Architectures – History of Database Systems.

UNIT- II: Database Design and ER model

Basic concepts - Entity sets and Relationship Sets – Constraints - Keys - Design Issues - Entity-Relationship Diagram- Weak Entity Sets - Extended E-R Features - Designing of an E-R Database Schema-Reduction of an E-R Schema to Tables.

UNIT- III: Relational Model

Introduction to the Relational Model – Structure of Relational Databases - Relational Algebra –Relational Calculus – Domain relational Calculus, Tuple Relational Calculus - Integrity and Security –Domain Constraints, Referential Integrity Constraints-Triggers-security and Authorization – SQL- Basic Structure, Set operations, Aggregate Operations –Null values- Nested Sub queries – Views –Modification of Database-Joined relations, Case Statement, NVL Function, Conversion Functions.

UNIT- IV: Informal Design guidelines for Relation Schema

Functional Dependencies– Normal Forms based on Primary Keys-Decomposition–Desirable properties of Decomposition – First Normal Form, Second Normal Form–Third Normal Form- Boyce- Codd Normal Form - Multivalued Dependency- Fourth Normal Form- Fifth Normal Form-Transactions-Transaction Concept- Transaction state- Implementation of atomicity and Durability- Concurrent Executions – Serializability, Recoverability-Implementation of Isolation.

UNIT-V: Concurrency Control

Lock Based Protocols, Dead Lock Handling, Multiple Granularity, Time-stamp Based Protocols, Validation Based Protocols.

Recovery System: Failure Classification, Storage Structure, Recovery and Atomicity, Log Based recovery, Shadow Paging, Recovery with concurrent transactions.

Storage and File Structure - File Organization – Organization of records in file - Data Dictionary Storage – Indexing and Hashing – Basic Concepts , Ordered Indices, B+ Tree Index files, B- tree index files – Static Hashing – Dynamic Hashing – Comparison of Indexing and Hashing.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Perceive the fundamental concepts of database management.

CO-2: Analyze database models & Entity Relationship models and to draw the E-R diagram for the given case study.

CO-3: Apply relational Database Theory, and be able to write relational algebra expressions for queries.

CO-4: Apply Normalization Process to construct the database and explain Basic Issues of Transaction processing.

CO-5: Compare the basic Database storage structures and access techniques: File Organization indexing methods including B- Tree and Hashing.

TEXT BOOKS:

1. Database System Concepts, Silberschatz, Korth , sixth Edition, McGraw hill.
2. Database Systems,Ramez Elmasri Shamkant B.Navathe Pearson Education,6th edition

REFERENCE BOOKS:

1. Database Management Systems, Raghu ramakrishnan, Johannes Gehrke, TATA Mc Graw Hill
2. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
3. Database Systems ,The Complete Book, Hector Garcia-Molina, Jeffrey D.Ullman, Jennifer Widom.
4. An Introduction to Database Systems, C.J. Date ,Eighth edition

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

JAVA PROGRAMMING
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-Requisites: Programming for Problem Solving

Course Objectives:

- This course introduces computer programming using the JAVA programming language with object-oriented programming principles.
- The use of Java in a variety of technologies and on different platforms.
- To understand fundamentals of object-oriented programming in Java which includes defining classes, invoking methods, using class libraries.
- Using API to solve real world problems.

UNIT-I

OOP Concepts: OOP Features, OOP Concepts-Data Abstraction, Encapsulation, Inheritance, Polymorphism, Classes and Objects, Procedural and Object Oriented Programming paradigms.

Java Programming: History of Java, Data Types, Variables, Constants, Scope and Life Time of Variable, Operators, Type Conversion and Casting, Conditional Statements, Iterative statements, Break and Continue statements, Access Controls, Arrays, Methods and Constructors, Static variables and Static methods, This reference, Overloading methods, Garbage collection, Nested Classes, and Inner Classes.

UNIT-II

Inheritance: Inheritance - types of Inheritance, Member access rules, Method Overriding, Super keyword, Preventing Inheritance: Final classes and methods.

Interfaces: Abstract class, defining an Interface, Abstract Vs Interface, implementing and extending Interface.

UNIT-III

Packages- Defining, creating and accessing a Package, and importing Packages.

Exception Handling- Exception Handling**,** Types of Exceptions. Usage of try, catch, throw, throws and finally, re-throwing exceptions, and User defined Exceptions.

UNIT-IV

Multi Threading- Creating Thread, Life cycle of Thread, Thread priorities, Synchronization of Threads, Inter-Thread Communication, and Producer Consumer Problem.

Collection Framework in Java- Overview of Java Collection Frame work, Generics, Commonly used Collection Classes and Interfaces-Array List, Vector, Hash Table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, Calendar, and Properties.

UNIT-V

GUI Programming with Java- AWT class Hierarchy, Introduction to Swing, Swing vs. AWT, Containers-JFrame, JApplet, and JPanel, Swing components- JButton, JLabel, JTextField, and JTextArea. Layout manager and its types.

Event Handling- Events, Event classes, Event Listeners, Delegation event model, Examples: handling a button click, and handling mouse and keyboard events.

Applet: Create an Applet, Life Cycle of an Applet, and passing parameters to Applet.

Course Outcomes:

CO-1: Understand the use of OOP concepts and solve real world problems using OOP techniques.
CO-2: Solve the inter-disciplinary applications using the concept of inheritance.
CO-3: Develop robust and faster applications by applying different exception handling mechanisms.
CO-4: Understand the multithreading concepts and develop efficient applications.
CO-5: Design GUI based applications and develops applets for web applications.

TEXT BOOK:

1. Java The Complete Reference, 8th Edition. herbert schildt. Indian edition.

REFERENCE BOOKS:

1. Java for Programmers, P.J. Dietel and H.M Dietel,Pearson Education (OR) JAVA: How to Program P.J. Dietel and H.M. Dietel, PHI.
2. Object Oriented Programming through Java, P. Radha Krishna, University Press.
3. Thinking in Java, Bruce Ecel, Pearson Education
4. Programming in Java, S. Malhotra and S. Choudary, Oxford Univ. Press.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO NETWORK SECURITY
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre requisites: Data Communications and Computer Networks.

Course Objectives:

- To explain the objectives of information security and importance and application of each of confidentiality, integrity, authentication and availability. Understand various cryptography concepts and techniques.
- To illustrate various symmetric key and asymmetric key cryptographic algorithms.
- To define the basic requirements of message authentication, hashing algorithms.
- To describe E-Mail Security with PGP, S/MIME.
- To discuss the requirements of SET, understand intrusion detection and Firewalls.

UNIT – I

Security Concepts: Introduction, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security, **Cryptography Concepts and Techniques:** Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, Steganography.

UNIT – II

Symmetric key Ciphers: Block Cipher principles, Feistel Cipher Structure, DES algorithm, AES algorithm, Multiple Encryption and Triple DES, Block cipher operation, Stream ciphers, RC4. **Asymmetric key Ciphers:** Principles of public key cryptosystems, RSA algorithm, Diffie- Hellman Key Exchange.

UNIT – III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm(SHA-512). **Message authentication codes:** Authentication requirements, HMAC, Digital signatures.

UNIT – IV

E-Mail Security: Pretty Good Privacy-Notations, PGP Operation-Authentication and Confidentiality, Cryptographic Keys and Key Rings, Message Transmission and Reception. **S/MIME**-S/MIME Functionality, Messages, Certificate Processing, Certification Authorities

UNIT – V

Web Security: Requirements, Secure Electronic Transaction (SET), Intruders, Firewall Design principles, Trusted Systems, Intrusion Detection Systems(Online Chapters and Appendices: Chapter 22,Chapter 23).

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Identifies various types of vulnerabilities, attacks, mechanisms and security services.
CO-2: Compare and contrast symmetric and asymmetric encryption algorithms.
CO-3: Implementation of message authentication, hashing algorithms.
CO-4: Explore E-Mail security, S/MIME Functionality.
CO-5: Develop intrusion detection system and designing of various types of firewalls.

TEXT BOOK:

1. Cryptography and Network Security - Principles and Practice: William Stallings,Pearson Education, 6th Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security :Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO CLOUD COMPUTING
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites:
1. A course on "Computer Networks"
2. A course on "Operating Systems"
3. A course on "Distributed Systems"

Course Objectives:
- This course provides an insight into cloud computing
- Topics covered include- distributed system models, different cloud service models, service-oriented architectures, cloud programming and software environments, resource management.

UNIT-I
Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT-II
Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing,Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models

UNIT-III
Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud,Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managingthe Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT-IV
Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

UNIT-V
Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjrasoft, Aneka Platform

Course Outcomes:
CO-1: Ability to understand various service delivery models of a cloud computing architecture.
CO-2: Ability to understand the ways in which the cloud can be programmed and deployed.
CO-3: Understanding Cloud Computing Architecture and Management
CO-4: Understanding cloud service Models.

CO-5: Understanding cloud service providers.

TEXT BOOK:

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp 2011.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTERNET OF THINGS (IoT)
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: Basic Programming Knowledge, Communications Protocols

Course Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices

UNIT I

Introduction to Internet of Things –Definition and Characteristics of IoT , Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data Analytics, Communication Protocols, Embedded Systems, IoT Levels and Templates, Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.

UNIT II

IoT and M2M – Introduction to M2M, Difference between M2M and IoT, Software Defined Networks, Network Function Virtualization, differences between SDN and NFV for IoT, Basics of IoT System Management with SNMP, NETCONF, NETOPEER.

UNIT IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python programs with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from gpio pins.

UNIT V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Web servers – Web server for IoT, Cloud for IoT, Python web application framework, Designing a RESTful web API.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Interpret the vision of IoT from global context.

CO-2: Perceive building blocks of Internet of Things and its characteristics.

CO-3: Learn the basic concepts of Python. Implement the python programming using Raspberry.

CO-4: Perceive the application areas of IoT. Realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks

CO-5: Determine the Market perspective of IoT. Develop Python web applications and cloud servers for IoT.

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

REFERENCE BOOK:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATA STRUCTURES AND ALGORITHMS
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites: A course on "Programming for Problem Solving".

Course Objectives:

- Exploring basic data structures such as stack sand queues.
- Introduce a variety of data structures such as hash tables, search trees, heaps, graphs.

UNIT -I

Basic Concepts: Algorithm specification- Introduction , Performance analysis and Performance measurement. Arrays: The Abstract data type, Sparsematrices- Introduction, Sparse matrix representation, Transposing a matrix.

Stacks and Queues : StackAbstractDataType,Stackoperations,QueueAbstractDataType,Queue operations.Evaluationofexpressions-Expressions,Postfixnotations,Infixtopostfix.

UNIT -II

Linked Lists: Singly linked lists and chains, Representing chains, Linked stacks and Queues,Doubly linked lists, Circular lists.

Trees: Introduction, Binary trees- The abstract data type, Properties of binary trees, Binary tree representations, Binary tree traversals- Inorder traversal, Preorder traversal, Post order traversal.

Binary search trees: Definition, Searching a binary search tree, Insertion into a binary search tree, Deletion from a binary search tree, Joining and Splitting binary search trees, Height ofa binary search tree.

UNIT-III

Heaps: Priority Queues, Definition of MAX heap, insertion into a MAX Heaps, Deletion froma MAX Heaps.

Efficient Binary Search Trees: Optimal binary search trees, AVL trees, rotations of AVLtrees. Multiway Search Trees: M-way search trees, B-trees.

UNIT -IV

Hashing: Introduction, Hash functions, Collision resolution Techniques - Hash tableoverflow, Extendible hashing.

Graphs: The Graph Abstract Data Type- Introduction, Definition, Graph representations, Elementary graph operations-Depth first search, Breadth first search.

UNIT -V

Sorting-Types of sorting, Insertion sort, Selection sort, Quick sort, Merge sort, Heapsort, External sorting-K-way merge sort, Comparison of all sorting methods.

Course Outcomes:

CO-1: Define the basic techniques of algorithm analysis
CO-2: Examine the linear and non linear data structures.
CO-3: Develop Priority Queues and Balanced Trees.
CO-4: Understand Hashing Techniques and Graph applications.
CO-5: Apply suitable algorithms for sorting Technique.

TEXT BOOK:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni andSusanAndersonFreed, Universities Press.

REFERENCE BOOKS:

1. Data Structures: A PseudocodeApproachwithC,2ndEdition, R.F. Gilberg and B.A.Forouz and Cengage Learning.
2. Data Structures using C–A.S.T anenbaum, Y.Langsam, and M.J. Augenstein, PHI/ Pearson Education.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ARTIFICIAL INTELLIGENCE
(OPEN ELECTIVE – CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-Requisites: None

Course Objectives:

- To learn the difference between optimal reasoning vs human like reasoning
- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI: namely Game Playing.
- To understand Theorem Proving, Expert Systems.

UNIT - I

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT - II

Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT - III

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Nonmonotonic Reasoning, Other Knowledge Representation Schemes Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT - IV

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

UNIT - V

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

Course Outcomes:

CO-1: Possess the ability to formulate an efficient problem space for a problem expressed in English.
CO-2: Possess the ability to select a search algorithm for a problem.
CO-3: Possess the skill for representing knowledge using the appropriate technique
CO-4: Possess the ability to apply AI techniques to solve problems of Game Playing,
CO-5: Possess the Expert Systems, Machine Learning and Natural Language Processing

TEXT BOOK:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, PrenticeHall, 2010.

REFERENCE BOOKS:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.
2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO MACHINE LEARNING
(OPEN ELECTIVE – CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: Programming for Problem solving,

Course Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understands the issues raised by current research.

UNIT-I

The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning.. (Text Book 1- page no: 1-80)

UNIT- II

Binary classification and related tasks: Classification, Scoring and ranking Beyond binary classification: Handling more than two classes, Regression, Unsupervised and descriptive learning. (Text Book 1- page no: 81-127)

UNIT-III

Intoduction of Concept Learning, Models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. (Text Book 1- page no: 129-156)

UNIT-IV

Rule models: Learning ordered rule lists, Learning unordered rule sets, The Perceptron: a heuristic learning algorithm for linear classifiers. (Text Book 1- page no: 194-218, 262-297).

UNIT- V

Support vector machines, Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical

Course Outcomes: After the completion of this course the students should be able to :

CO-1: Explain the theory underlying machine learning.
CO-2: Learn beyond binary classification.
CO-3: Recognize and implement various genetic algorithms.
CO-4: Construct algorithms to learn tree, to learn linear, non-linear models and Probabilistic models.
CO-5: Able to analyze the data.

TEXT BOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. The R Book. Second Edition. Michael J. Crawley. 3. Machine Learning, Tom M. Mitchell, MGH.

REFERENCE BOOKS:

1. Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai BenDavid, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

NEURAL NETWORKS
(OPEN ELECTIVE – CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre requisites: None

Course Objectives:

- To understand the biological neural network and to model equivalent neuron models.
- To understand the architecture, learning algorithm and issues of various feed forward and feedback neural networks.

UNIT – I

Introduction: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks Learning Process: Error Correction Learning,

UNIT – II

Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process

Single Layer Perceptron : Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques,

UNIT-III

Perceptron –Convergence Theorem, Relation Between Perceptron and Bayes Classifier for a Gaussian Environment Multilayer Perceptron: Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection.

UNIT-IV

Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection.

UNIT-V

Back Propagation and Differentiation, Hessian Matrix, Generalization, Cross Validation, Network Pruning Techniques, Virtues, and Limitations of Back Propagation Learning, Accelerated Convergence, Supervised Learning

Course Outcomes:

By completing this course the student will be able to:

CO-1: Describe different neural networks of various architectures
CO-2: Understand the feed forward and feed backward.
CO-3: Design the training of neural networks.
CO-4: Learn various learning rules.
CO-5: Develop the testing of neural networks and do the perform analysis of these networks for various pattern recognition application.

TEXT BOOKS:

1. Neural Networks a Comprehensive Foundations, Simon Haykin, PHI edition.

REFERENCE BOOKS:

1. Artificial Neural Networks – B. Yegnanarayana Prentice Hall of India P Ltd 2005
2. Neural Networks in Computer Intelligance , Li Min Fu TMH 2003
3. Neural Networks -James A Freeman David M S Kapura Pearson Education 2004.
4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO CYBER SECURITY
(OPEN ELECTIVE – CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites: Basic Computer knowledge.

Course Objectives:

- To introduce the methodologies and framework of ethical hacking for enhancing the security.
- To learn about cybercrimes and how they areplanned.
- To learn the vulnerabilities of mobile and wireless devices.
- To learn about the cyber-Law and legalperspectives.

UNIT – I

Introduction to Cybercrime: Introduction, Cybercrime and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, Cyber-crime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.
(Text Book-1 : Page no : 1 – 39)

UNIT – II

Cryptography: Introduction Cryptography, Steganography, Objectives of Cryptography: Confidentiality, Integrity, Authenticity, Non-repudiation, Accountability, Types of Attacks:
Passive Attacks, Active Attacks, Introduction to Symmetric key cryptography, Asymmetric Key Cryptography, Hashing. (Text Book-2)

UNIT – III

Cyber Offenses: How Criminals Plan Them: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber café and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector.(Text Book-1 : Page no : 45 –78)

UNIT – IV

Cybercrime: Mobile and Wireless Devices:Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones. (Text Book-1 : Page no : 81-119)

UNIT – V

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DdoS attacks, SQL Injection, Buffer Overflow.(Text Book-1 : Page no :125-170)

Course Outcomes:

CO-1: After the completion of this course, the students should be able to
CO-2: Outline key terms and concepts in cyber law, intellectual property and cybercrimes.
CO-3: Understand basic cryptography and stenography.
CO-4: Explore the vulnerabilities, threats and cybercrimes posed by criminals.
CO-5: Identify various security challenges phased by mobile devices and identify various types of tools and methods used in cybercrime, develops the secure counter methods to maintain security protection.

TEXT BOOKS:

1 .Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.

3. Cryptography and Network Security – Principles and Practice: William Stallings, Pearson Education, 6th Edition

REFERENCE BOOKS:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

2. Introduction to Cyber Security, Chwan-Hwa (john) Wu, J. David Irwin. CRC Press T&F Group.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO DATA SCIENCE
(OPEN ELECTIVE – CSE (DATA SCIENCE))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(AI&ML) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: Basics of Computer science and Mathematics

Course Objectives:

- To understand the basic concepts of Data Science
- To learn data pre processing and techniques for data analytics
- Understand the statistical concepts for data science.

UNIT-I:

Introduction: What Is Data Science? How Does Data Science Relate to Other Fields? Data Science and Statistics, Computer Science, Engineering, and Business Analytics. Data Science, Social Science, and Computational Social Science, The Relationship between Data Science and Information Science, Information vs. Data, Skills for Data Science, Tools for Data Science, Issues of Ethics, Bias, and Privacy in Data Science.(TB1)

UNIT-II:

Data: Introduction, Data Types, Structured Data, Unstructured Data, Challenges with Unstructured Data, Data Collections, Open Data, Social Media Data, Multimodal Data, Data Storage and Presentation, Data Pre-processing, Data Cleaning, Data Integration, Data Transformation , Data Reduction, Data Discretization.(TB1)

UNIT-III:

Techniques: Introduction, Data Analysis and Data Analytics, Descriptive Analysis, Variables, Frequency Distribution, Measures of Centrality, Dispersion of a Distribution, Diagnostic Analytics, Correlations, Predictive Analytics, Prescriptive Analytics, Exploratory Analysis, Mechanistic Analysis, Regression.(TB1)

UNIT-IV:

Statistical Data Analysis: Role of statistics in data science, Kinds of statistics, Descriptive statistics, Inferential statistics, Probability theory , Random variables, Independence, Four perspectives on probability, Bayesian probability, Probability distribution .(TB2)

UNIT-V:

Machine Learning for Data Science: Overview of machine learning, Supervised machine learning , Regression methods, Classification methods, KNN classification, Decision tree classification, Naive Bayes classification, Unsupervised machine learning, Clustering methods, K-means, Principle Component Analysis (PCA), Association Analysis, Apriori algorithm, FP-Growth Analysis. (TB2)

Course Outcomes: After completing this course the students will be able to

CO1: Understand the basic concepts of Data Science.
CO2: Learn about types of data and data pre processing.
CO3: Understand the techniques for data analytics.
CO4: Learn the statistical fundamentals related to Data Science.
CO5: Understand the concepts of Machine Learning for Data Science.

TEXT BOOK

1. Chirag Shah, A Hands-On Introduction To Data Science, Cambridge University Press.
2. Data Science Fundamentals and Practical Approaches. Dr. Gypsy Nandi, Dr. Rupa Kumar Sharma.

REFERENCE BOOKS

1. Doing Data Science, Straight Talk from The Frontline. Cathy O'Neil and Rachel Schutt, O'Reilly, 2014.

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

DATA HANDLING AND VISUALIZATION
(OPEN ELECTIVE – CSE (DATA SCIENCE))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(AI&ML) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: Fundamentals of Data Science
Course Objectives:

- Understand basics of Data Visualization
- Learn about visualization of distributions.

UNIT-I:
Introduction to Visualization: Visualizing Data-Mapping Data onto Aesthetics, Aesthetics and Types of Data, Scales Map Data Values onto Aesthetics, Coordinate Systems and Axes- Cartesian Coordinates, Nonlinear Axes, Coordinate Systems with Curved Axes, Colour Scales-Colour as a Tool to Distinguish, Colour to Represent Data Values ,Colour as a Tool to Highlight.

UNIT-II:
Directory of Visualizations- Amounts, Distributions, Proportions, x–y relationships, Geospatial Data. Visualizing Distributions: Visualizing Amounts-Bar Plots, Grouped and Stacked Bars, Dot Plots and Heatmaps, Visualizing Distributions: Histograms and Density Plots- Visualizing a Single Distribution, Visualizing Multiple Distributions at the Same Time.

UNIT-III:
Visualizing Proportions-A Case for Pie Charts, A Case for Side-by-Side Bars, A Case for Stacked Bars and Stacked Densities, Visualizing Proportions Separately as Parts of the Total ,Visualizing Nested Proportions-Nested Proportions Gone Wrong, Mosaic Plots and Treemaps, Nested Pies ,Parallel Sets.

UNIT-IV:
Visualizing Associations Among Two or More Quantitative Variables-Scatterplots, Correlograms, Dimension Reduction, Paired Data. Visualizing Time Series and Other Functions of an Independent Variable-Individual Time Series , Multiple Time Series and Dose–Response Curves, Time Series of Two or More Response Variables

UNIT-V:
Visualizing Trends-Smoothing, Showing Trends with a Defined Functional Form, Detrending and Time-Series Decomposition, Visualizing Geospatial Data-Projections, Layers, Choropleth Mapping, Cartograms, Visualizing Uncertainty-Framing Probabilities as Frequencies, Visualizing the Uncertainty of Point Estimates, Visualizing the Uncertainty of Curve Fits, Hypothetical Outcome Plots.
Course Outcomes: After completing this course the students will be able to
CO1: Understand the fundamentals of Data Visualization.
CO2: Learn the concepts of Visualizing Distributions
CO3: Understand how to Visualizing Proportions and Nested Proportions
CO4: Learn the concepts of Visualizing Associations and Time series data.
CO5: Understand the different Visualizing Trends

TEXT BOOK

1. Claus Wilke, "Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures", 1st edition, O'Reilly Media Inc, 2019.

REFERENCE BOOKS

1. Tony Fischetti, Brett Lantz, R: Data Analysis and Visualization,O'Reilly ,2016
2. Ossama Embarak, Data Analysis and Visualization Using Python: Analyze Data to Create Visualizations for BI Systems,Apress, 2018

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO BIG DATA
(OPEN ELECTIVE – CSE (DATA SCIENCE))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(AI&ML) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: DBMS

Course Objectives:

- To understand the basic concepts of Big Data
- To learn distributed computing and big data analytics
- Understand the fundamentals of Hadoop and Map Reduce.

UNIT-I:

Grasping the Fundamentals of Big Data: The Evolution of Data management, Understanding the Waves of Managing Data. Defining big data, Building a Successful Big Data Management Architecture, The Big Data Journey. Examining Big Data Types, Defining Structured Data, Defining Unstructured Data, Putting Big Data Together.(TB1)

UNIT-II:

Types of Digital Data: Classification of Digital Data: Structured data, Semi-structured data and Unstructured. Introduction to Big Data: Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data?, Why Big Data?, Traditional Business Intelligence (BI) versus Big Data, A Typical Data Warehouse Environment, A Typical Hadoop Environment, What is New Today?, What is Changing in the Realms of Big Data? (TB2)

UNIT-III:

A Brief History of Distributed Computing, Giving thanks to DARPA, Understanding the Basics of Distributed Computing. Big Data Technology Components: Exploring the Big Data Stack, Big Data Analytics, Big Data Applications. Cloud and Big Data: Defining the Cloud in the Context of Big Data, Understanding Cloud Deployment and Delivery Models, Making Use of the Cloud for Big Data, Providers in the Big Data Cloud Market.(TB1)

UNIT-IV:

Introduction to Hadoop: Features and advantages and versions of Hadoop. Hadoop Ecosystems and distributions. Hadoop versus SQL. Introducing Hadoop, RDBMS versus Hadoop, Distributed Computing Challenges, History of Hadoop, Hadoop Overview, HDFS (Hadoop Distributed File System), Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN (Yet Another Resource Negotiator), Interacting with Hadoop Ecosystem: PIG, HIVE & HBase. (TB2)

UNIT-V:

MapReduce Fundamentals: Tracing the Origins of MapReduce, Understanding the map Function, Adding the reduce Function, Putting map and reduce Together, Optimizing MapReduce Tasks. Integrating Big Data with the Traditional Data Warehouse, Big Data Analysis and the Data Warehouse, Changing the Role of the Data Warehouse.(TB1)

Course Outcomes: After completing this course the students will be able to

CO1: Understand the importance of Big Data.
CO2: Learn about the types of data and Big Data Analytics.
CO3: Understand the Big Data technology components and applications.
CO4: Learn the basics of Hadoop Eco system.
CO5: Understand the map reduce fundamentals.

TEXT BOOK

1. Big Data for Dummies, Judith Hurwitz, Alan Nugent, Dr. Fern Halper, and Marcia Kaufman, Wiley
2. Big Data and Analytics, Seema Acharya, Subhasinin Chellappan, Wiley publications.

REFERENCE BOOKS

1. Big Data, Black BookTM , DreamTech Press, 2015 Edition.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO COMPUTER FORENSICS
(OPEN ELECTIVE – CSE (DATA SCIENCE))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(AI&ML) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: Fundamentals of Computers

Course Objectives:

- Understand the fundamentals of computer forensics.
- Learn about the different computer forensics systems and data collection methods.
- Understand Computer Forensics Analysis.

UNIT-I:

Computer Forensics Fundamentals: Introduction to Computer Forensics, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/ Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps Taken by Computer Forensics Specialists. Types of Computer Forensics Technology: Types of Military Computer Forensic Technology and Business Computer Forensic Technology. Specialized Forensics Techniques, Encryption Methods and vulnerabilities, Protecting Data from Being Compromised.

UNIT-II:

Types of Computer Forensics Systems: Internet Security Systems, Intrusion Detection Systems, Firewall Security Systems, Storage Area Network Security Systems , Network Disaster Recovery Systems, Public Key Infrastructure Systems, Wireless Network Security Systems, Instant Messaging (IM) Security Systems, Net Privacy Systems, Identity management Security Systems, Identity Theft, Biometric Security Systems, Homeland Security Systems.

UNIT-III:

Computer Forensics Evidence and Capture: Data Recovery Defined, Data Back-up and Recovery, The Role of Back-up in Data Recovery, The Data-Recovery Solution. Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options, Obstacles, Types of Evidence, The Rules of Evidence ,Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collection, Artifacts, Collection Steps.

UNIT-IV:

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene, Computer Evidence Processing Steps, Legal Aspects of Collecting and Preserving, Computer Forensic Evidence. Computer Image Verification and Authentication: Special Needs of Evidential Authentication, Practical Consideration, Practical Implementation.

UNIT-V:

Computer Forensics Analysis: Discovery of Electronic Evidence, Electronic Document Discovery: A Powerful New Litigation Tool, Identification of Data: Timekeeping, Forensic Identification and Analysis of Technical Surveillance Devices. Reconstructing Past Events: How to Become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files.

Course Outcomes: After completing this course the students will be able to

CO1: Understand the definition of computer forensics fundamentals.

CO2. Describe the types of computer forensics technology. Analyze various computer forensics systems.

CO3. Illustrate the methods for data recovery, evidence collection and data seizure.

CO4. Summarize duplication and preservation of digital evidence. Evaluate the effectiveness of available digital forensics tools.

CO5. Employ fundamental computer theory in the context of computer forensics practices

Text Books:

1. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.

Reference Books:

1. Real Digital Forensics by Keith J. Jones, Richard Bejtiich, Curtis W. Rose, Addison- Wesley Pearson Education
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning.
3. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

MANAGEMENT SCIENCE
(OPEN ELECTIVE – MBA)

B.Tech – CIVIL, EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: None

Course Objectives:

- This course is intended to familiarize the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organizational structure, production operations, marketing, human resource management, product management and strategy.

UNIT - I:

Introduction to Management and Organization: Concepts of Management and organization-nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory- Fayal's Principles of Management- Maslow's theory of Hierarchy of Human Needs- Douglas McGregor's Theory X and Theory Y - Hertzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management, Designing Organizational Structures: Basic concepts related to Organization - Departmentation and Decentralization, Types and Evaluation of mechanistic and organic structures of organization and suitability.

UNIT - II:

Operations and Marketing Management: Principles and Types of Plant Layout-Methods of Production(Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement - Business Process Reengineering(BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality, Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Store Records - JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT - III:

Human Resources Management (HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating - Capability Maturity Model (CMM) Levels - Performance Management System.

UNIT - IV:

Project Management (PERT/ CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT - V:

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

TEXT BOOKS:

1. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
2. P. Vijay Kumar, N. Appa Rao and Ashnab, Chnalill, Cengage Learning India, 2012.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich Management - Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford Uiversity Press, 2012.
5. Samuel C. Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Clueck: Business Policy and Stragtegic Management Science, McGraw Hill, 2012.

Course Outcomes:

CO1 Outline the fundamentals of management and contributions to management.

CO2 Define the social Responsibilities of an organization towards stakeholders and build the suitable organization structure and to identify factors influencing plant location and layout decisions.

CO3 Know importance of materials management, evaluate quality of products using SQC techniques and Identify the basic concepts of marketing mix and Human Resource concepts.

CO4 Know how PERT and CPM different and to construct network by proper planning organizing an managing the efforts to accomplish a successful project.

CO5 Appraise all contemporary management practices and analyze how these contemporary management practices one applicable in modern business and service organizations.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ENTREPRENEURSHIP DEVELOPMENT
(OPEN ELECTIVE – MBA)

B.Tech – CIVIL, EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: None

Course Objective: The objective of the course is to make students understand the nature of entrepreneurship, and to motivate the student to start his/her own enterprise. The objective of the course is to enlighten with the fragrance of Corporate Good Governance and Business Ethics, so that they would become the best entrepreneurs / managers of the corporate world.

Unit – I

Nature of Entrepreneurship; Characteristics – Qualities and skills of an Entrepreneur – Functions of entrepreneur – Entrepreneur scenario in India and Abroad. Forms of Entrepreneurship: Small Business – Importance in Indian Economy – Types of ownership – Sole trading – Partnership – Joint stock company and other forms. First – Mover disadvantages, Risk Reduction strategies, Market scope strategy, Imitation strategies and Managing Newness

Unit – II

Aspects of Promotion: Generation of new entry opportunity, SWOT Analysis,Technological Competitiveness, legal regulatory systems, patents and trademarks, Intellectual Property Rights-Project Planning and Feasibility Studies- Major steps in product development. Financial Aspects: Sources of raising Capital, Debt-Equity, Financing by Commercial Banks, Government Grants and Subsidies, Entrepreneurship Promotion Schemes of Department of Industries (DIC), KVIC, SIDBI, NABARD, NSIC, APSFC, IFCI and IDBI. New Financial Instruments.

Unit - III

Introduction to Business Ethics: Necessity for Business Ethics-Need for Ethical guideline –Salient Issues in Ethics and Commerce- Ethics as a Luxury – Earlier attempts at Ethics in Industry – Justification for Ethics – Effect of Migration of National Character – Shadow Economy – Basic Principles in Ethics – Corporate Climate and corporate climate audits – Political Issues – Nature and theory of Ethics – The Naturalistic fallacy - G.E.Moore's Philosophy.

Unit – IV

Understanding Corporate Governance: Corporate Governance- Capitalism at crossroads – Historical perspective of Corporate Governance – Issues of Corporate Governance – Theoretical basis of Corporate Governance – Corporate Governance mechanisms – Indian Model of Governance – Good Corporate Governance – Corporate Governance committees – OECD Principles – Indian Committee and guidelines – The confederation of Indian Industry's initiative. Corporate Governance Models, Corporate Social Responsibility.

Unit – V

Corporate Social Responsibility: System Concept of Business Society – SocialResponsibility – Social Responsibility tools – approaches to Ethics – Corporate Social Accountability - Business in a Social World – Ethics and Social Responsibility – professional ethics – Ethics of practicing company secretaries- Ethical investing.

Text Books:

1. Robert D Hisrich, Michael P Peters, Dean A Shepherd: Entrepreneurship, TMH, 2009
2. Vasanth Desai: Entrepreneurship, HPH, 2009
3. C.S.V.Murthy: Business Ethics & Corporate Governance, Himalaya, 2009.

References:

1. Bholanath Dutta: Entrepreneurship Text and Cases, Excel, 2009
2. David Martin: Corporate Governance, Viva, 2009
3. H. Nandan: Fundamentals of Entrepreneurship, PHI, 2009.
4. Barringer: Entrepreneurship, Pearson,2009.
5. Ronald D Francis & Mukti Mishra: Business Ethics, TMH, 2009
6. RK Mishra,Gitarani: Corporate Governance, Excel,2009
7. A.C.Frenando: Corporate Governance, Pearson, 2006
8. V.Balachandran &V.Chandrasekaran: Corporate Governance & Social Responsibility, PHI, 2009
9. A.C.Fernando: Business Ethics, Pearson, 2009
10. Laura P Hartman & Abha Chatterjee: Business Ethics, TMH, 2009
11. Tripat Kaur: Values and Ethics in Management, 2/e, Paragon International,2009.

Course Outcomes:

CO1 Explain characteristics, Qualities, Skills and Functions of Entrepreneur.
CO2 Demonstrates Entrepreneur Scenario in India and abroad.
CO3 Summarizes necessity for business ethics and ethical guidelines in business.
CO4 Interprets about Government Grants and subsides and Entrepreneurship promotion schemes.
CO5 Prioritizes corporate social responsibility and professional ethics by company secretaries.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE – MBA)

B.Tech – CIVIL, EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: None

Course Objectives:

- In the interest of the national economic growth the innovations and improvements are to be owed and used for the production and distribution process. The Students of technology willnbe benefited by knowing the process of obtaining recognition of their innovations. This course will enable them to know the legal process of registering the innovation.

UNIT – I

INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property,International organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

TRADE MARKS: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter,selecting and evaluating trade mark, trade marks registration processes.

UNIT – III

LAW OF COPY RIGHTS: Fundamental of copy right law, originally of material, rights of reproduction,rights of perform the work publicity, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

LAW OF PATENTS: Foundation of patent law, patent searching process ownership rights and transfer.

UNIT- IV

TRADE SECRETS: Trade secrete law, determination of trade secrete status, liability for misappropriations oftrade secrets, protection for submission trade secrete litigation.

UNIT-V

NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: New developments in trade mark law: Copyright law, patent law, intellectual property audits.

TEXT BOOOKS & REFERENCES:

1. Intellectual property rights, Deborah, E. Bouchux, cengage learing
2. Intellectual property right – Unleashing the knowledge economy, prabuddhaganguli, Tate Mc Graw Hill Publishing company ltd.

Course Outcomes:

CO1 Outline the increasing importance of Intellectual Property Rights
CO2 Utilize post registration procedures and trade mark registration process
CO3 Explain the copyright principles and rights
CO4 Prioritize the law of patents and patent ownership
CO5 Develop the trade secret and maintenance

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